

Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

## **M E M O R A N D U M**

**TO:** John Mitnik, Assistant Executive Director, Executive Office Staff

**FROM:** SFWMD Staff Environmental Advisory Team

**DATE:** January 25, 2023

**SUBJECT:** Weekly Environmental Conditions for Systems Operations

### **Summary**

#### **Weather Conditions and Forecast**

A cold front will move southward into the northern interior of the District late Wednesday night. Light shower activity is likely to commence over the far north late Wednesday ahead of the frontal passage and will shift over the far south on Thursday. Only light rainfall accumulations less than 0.10" are expected during the frontal passage. Afterwards, brisk northwesterly winds will transport cold and dry air southward into the SFWMD, canceling any rain chances on Friday and Saturday. On Sunday, surface and mid-level high pressure will restore southeasterly flow to the region, forcing the remnant frontal boundary northwards. A slight increase in moisture and temperatures could support some light shower activity along the lower east coast and far north on Sunday. Afterwards, rain chances are likely to increase area-wide on Monday from a fast-moving upper disturbance over the southeast US. Much below average total SFWMD rainfall is expected for the 7-day period ending next Tuesday morning.

#### **Kissimmee**

Releases were made from East Lake Toho and Lake Toho to continue their recessions to their respective low pools on June 1. Weekly average discharges on January 22, 2023 at S-65 and S-65A were 1,300 cfs and 1,400 cfs, respectively. Mean weekly water depth on the Kissimmee River floodplain decreased slightly from the previous week, from 0.59 feet to 0.46 feet. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 6.8 mg/L the previous week to 7.3 mg/L for the week ending January 22, 2023, above both the potentially lethal level and the physiologically stressful range for largemouth bass and other sensitive species.

#### **Lake Okeechobee**

Lake Okeechobee stage was 16.09 feet NGVD on January 22, 2023, which is 0.06 feet lower than the previous week and 0.38 feet lower than a month ago (**Figure LO-1**). Lake stage remained in the Intermediate sub-band and was 0.59 feet above the upper limit of

the ecological envelope. This is the third year in a row Lake stages have exceeded 16.0 feet NGVD in the fall or winter season and is the highest Lake stage at this time of year for more than two decades. According to NEXRAD, no rain fell directly on the Lake last week. Average daily inflows (excluding rainfall) were similar to the previous week, going from 1,648 cfs to 1,588 cfs. Average daily outflows (excluding evapotranspiration) were also similar to the previous week going from 2,904 cfs to 2,856 cfs. The most recent satellite image (January 19, 2023) from NOAA's Harmful Algal Bloom Monitoring System showed low bloom potential across much of the pelagic region, but moderate bloom in scattered areas along the nearshore, especially in the south end of the Lake.

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged 186 cfs over the past week with 50 cfs coming from Lake Okeechobee. Mean salinities increased at all sites over the past week. Salinity in the middle estuary was in the optimal range (10-25) for adult eastern oysters. Total inflow to the Caloosahatchee Estuary averaged 2,027 cfs over the past week with 1,291 cfs coming from Lake Okeechobee. Mean salinities remained the same at S-79, decreased at Val I-75 and Ft. Myers, and increased at the remaining sites in the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range for adult eastern oysters at Cape Coral (10-25) and in the upper stressed range at Shell Point and Sanibel (>25).

## **Stormwater Treatment Areas**

For the week ending Sunday, January 22, 2023, 2,600 ac-ft of Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2023 (since May 1, 2022) is approximately 16,800 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 985,000 ac-feet. Most STA cells are at or near target stage, except STA-5/6 where most cells are below target. STA-1E Western Flow-way is offline for post-construction vegetation grow in, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, and STA-2 Flow-way 2 is offline for post-construction vegetation grow in. Operational restrictions are in effect in STA-1E Central and Eastern Flow-ways, STA-1W Eastern, Western, and Northern Flow-ways, and STA-2 Flow-ways 3 and 4 for vegetation management activities. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

## **Everglades**

Last week rates of stage change in EPA was in the "fair" or "good" category. Depths are above average in WCA-3A northeast (but remain one of the shallowest regions in the WCAs), maintaining that condition could be important for wading bird nesting in that region. Wading birds are foraging in lower numbers WCA-3A North and conditions there remain similar to last year (drying down early), which was a poor to moderate wading bird nesting season. Wading bird nesting is just beginning across the system with Wood Storks nesting at the Jetport colony. Taylor slough stages fell again last week but remain well above the pre-Florida Bay initiative average. Average salinity increased last week in

the nearshore of Florida Bay. Salinities in the Eastern and now Central Bay are above the IQR.

### **Biscayne Bay**

Total inflow to Biscayne Bay averaged 234 cfs and the previous 30-day mean inflow averaged 461 cfs. The seven-day mean salinity was 27.4 at BBCW8 and 24.2 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data provided by Biscayne National Park.

## **Supporting Information**

### **Kissimmee Basin**

#### ***Upper Kissimmee***

On January 22, 2023, mean daily lake stages were 57.3 feet NGVD (0.7 feet below schedule) in East Lake Toho, 54.4 feet NGVD (0.6 feet below schedule) in Lake Toho, and 52.1 feet NGVD (0.4 below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

#### ***Lower Kissimmee***

For the week ending January 22, 2023, mean weekly discharge was 1,300 cfs at S-65 and 1,400 cfs at S-65A. Mean weekly discharge from the Kissimmee River was 1,300 cfs at S-65D and 1,400 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.3 feet NGVD at S-65A and 28.4 feet NGVD at S-65D on January 22, 2023. Mean weekly river channel stage stayed approximately the same as the previous week's mean of 37.5 feet (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain for the week ending January 22, 2023 decreased slightly from the previous week, from 0.59 feet to 0.46 feet (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 6.8 mg/L the previous week to 7.3 mg/L for the week ending January 22, 2023 (**Table KB-2, Figure KB-6**).

#### ***Water Management Recommendations***

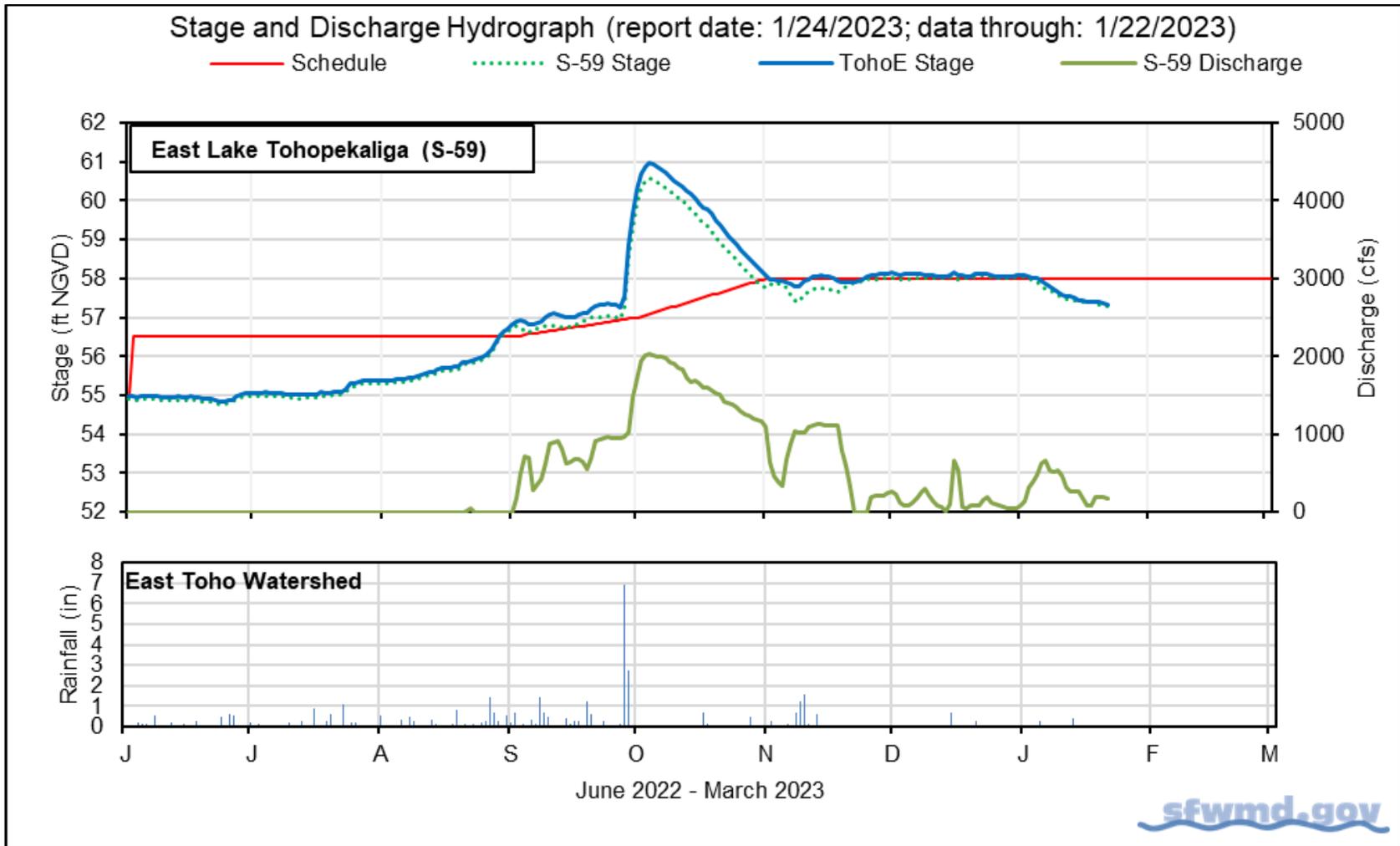
Continue stage recessions in Lake Toho and East Lake Toho to their June 1 low pools. Per the IS-14-50.0 discharge plan, adjust S-65 discharge to maintain a minimum flow of at least 1,400 cfs at S-65A to the Kissimmee River while stage in KCH is at or above 50 ft (**Figure KB-7**).

**Table KB-1.** Average discharge for the preceding seven days, Sunday’s average daily stage and Sunday’s average daily departure from KCOL flood regulation lines or temporary schedules. All data are provisional.

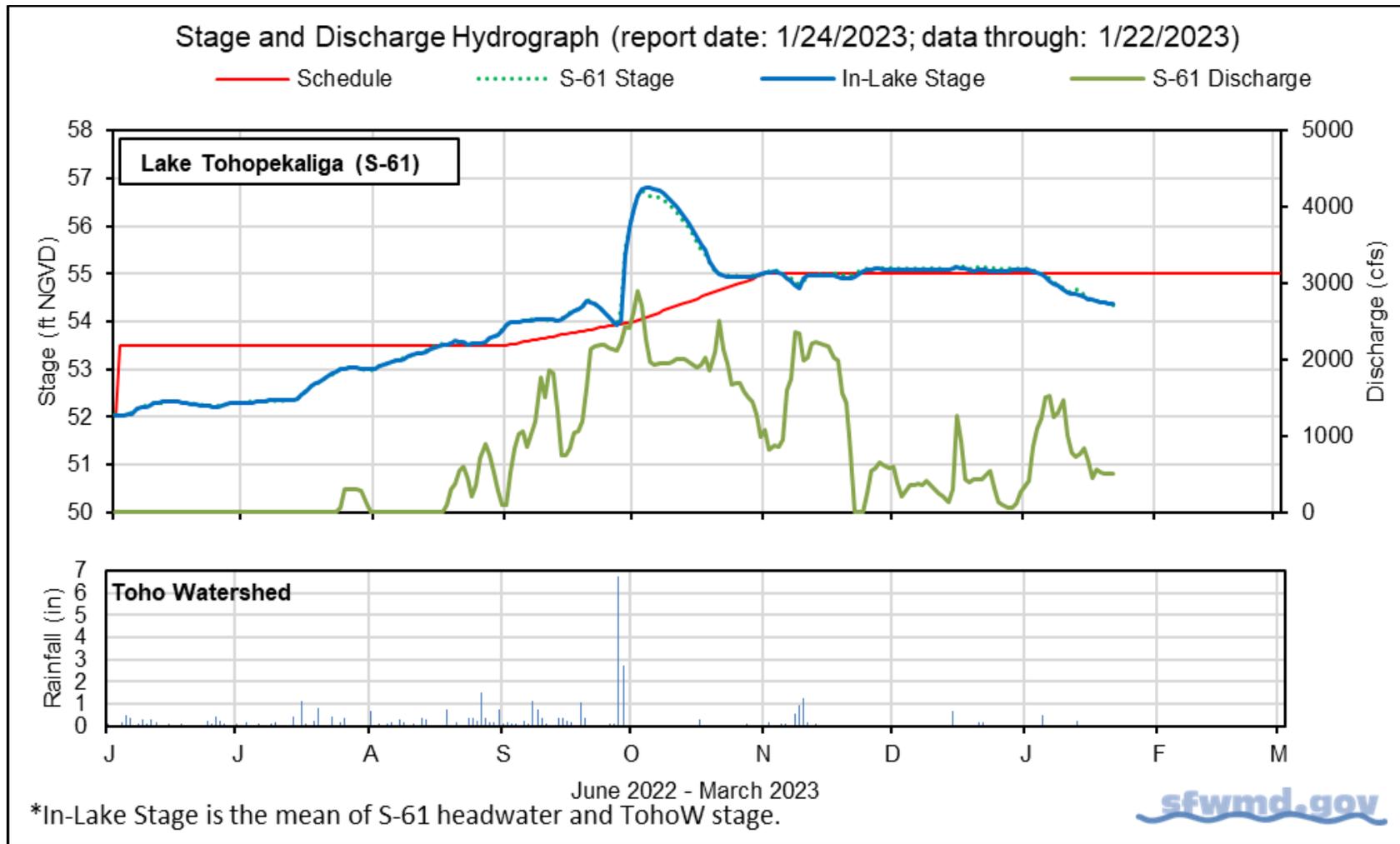
Water Body	Structure	Stage Monitoring Site	Weekly (7-Day) Average Discharge (cfs)	Sunday Lake Stage (feet NGVD) <sup>a</sup>	Schedule Type <sup>b</sup>	Sunday Schedule Stage (feet NGVD)	Sunday Departure from Regulation (feet)	
							1/22/23	1/15/23
Lakes Hart and Mary Jane	S-62	LKMJ	33	61.1	R	61.0	0.1	0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	21	61.5	R	61.4	0.1	0.0
Alligator Chain	S-60	ALLI	0	64.0	R	64.0	0.0	0.0
Lake Gentry	S-63	LKGT	0	61.6	R	61.5	0.1	0.0
East Lake Toho	S-59	TOHOE	160	57.3	R	58.0	-0.7	-0.6
Lake Toho	S-61	TOHOW S-61	530	54.4	R	55.0	-0.6	-0.5
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1300	52.1	R	52.5	-0.4	-0.2

a. Names of in-lake monitoring sites and structures used to determine lake stage. If more than one site is listed, an average is reported.

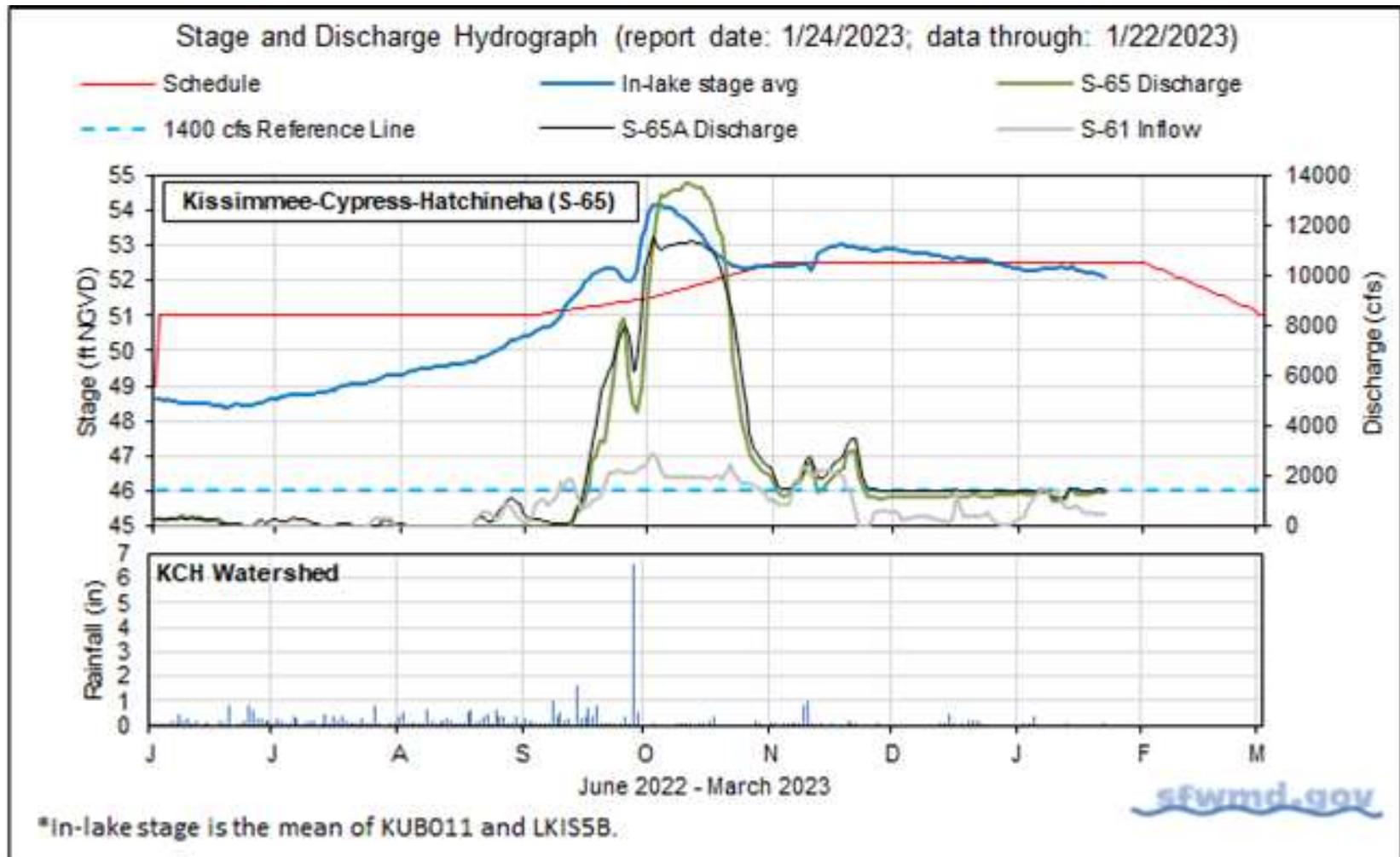
b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.



**Figure KB-1.** East Lake Toho regulation schedule, stage, discharge and rainfall.



**Figure KB-2.** Lake Toho regulation schedule, stage, discharge and rainfall.



**Figure KB-3.** Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

**Table KB-2.** One- and seven-day average discharge and stage at Lower Kissimmee basin structures, river channel dissolved oxygen concentrations and water depths in the Phase I area floodplain. All data are provisional.

Metric	Location	Sunday Daily Average	Weekly Average for Previous Seven Day Periods			
		1/22/23	1/22/23	1/15/23	1/8/23	1/1/23
Discharge	S-65	1,300	1,300	1,200	1,300	1,300
Discharge	S-65A <sup>a</sup>	1,400	1,400	1,300	1,400	1,400
Headwater Stage (feet NGVD)	S-65A	46.3	46.3	46.5	46.4	46.3
Discharge	S-65D <sup>b</sup>	1,300	1,300	1,400	1,400	1,500
Headwater Stage (feet NGVD)	S-65D <sup>c</sup>	28.4	28.4	28.3	28.4	28.3
Discharge (cfs)	S-65E <sup>d</sup>	1,400	1,300	1,500	1,500	1,500
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) <sup>e</sup>	Phase I, II/III river channel	6.8	7.3	6.8	6.6	7.7
River channel mean stage <sup>f</sup>	Phase I river channel	37.5	37.5	37.4	37.6	37.6
Mean depth (feet) <sup>g</sup>	Phase I floodplain	0.45	0.46	0.59	0.64	0.66

a. Combined discharge from main and auxiliary structures.

b. Combined discharge from S-65D, S-65DX1 and S-65DX2.

c. Average stage from S-65D and S-65DX1.

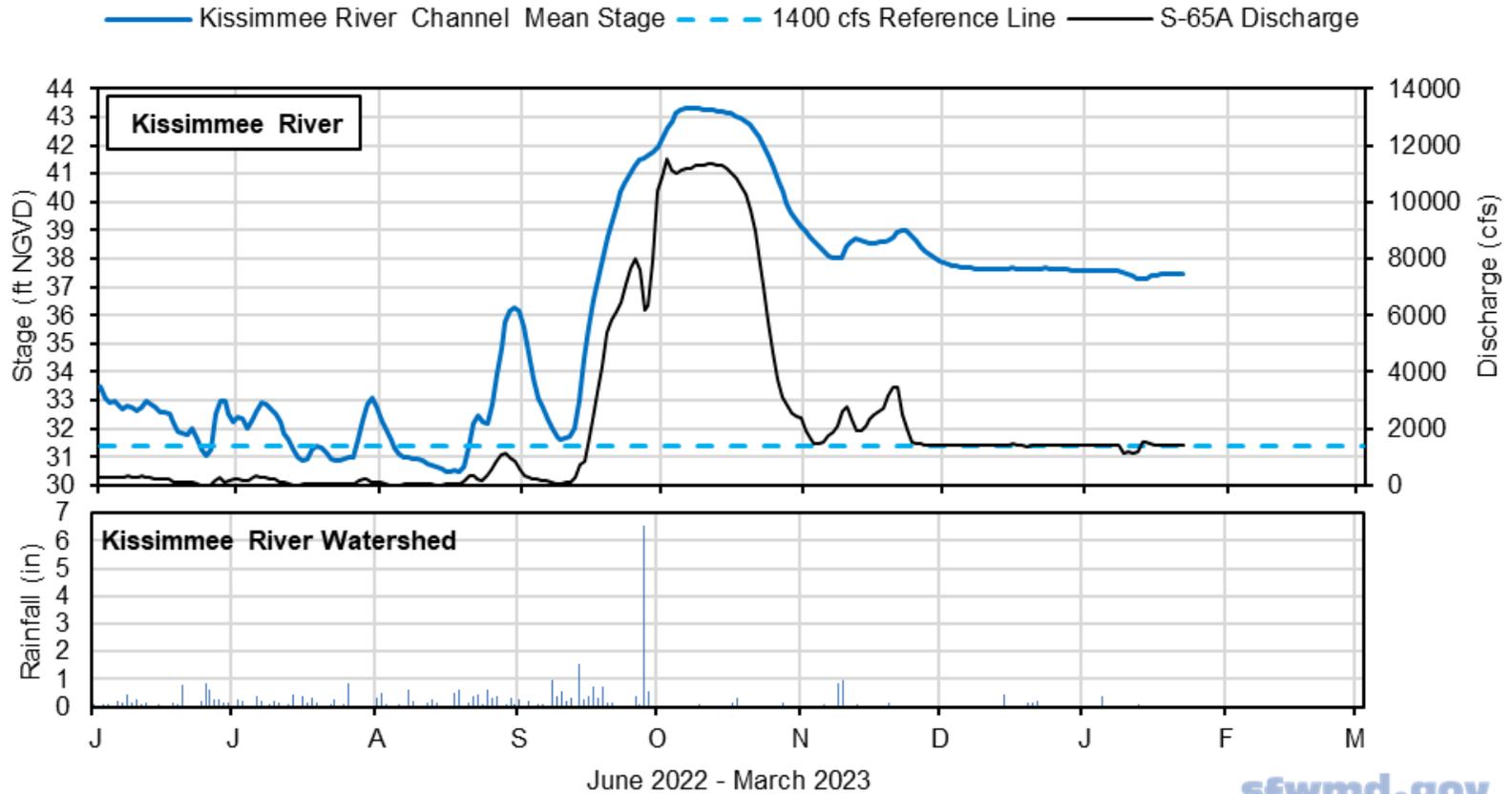
d. Combined discharge from S-65E and S-65EX1.

e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC33, PD62R and PD42R.

f. Mean of five river channel stations (PC62, KRDR02, KRBN, PC33, PC11) in the Phase I area.

g. One-day spatial average obtained from the South Florida Water Depth Assessment Tool (SFWDAT).

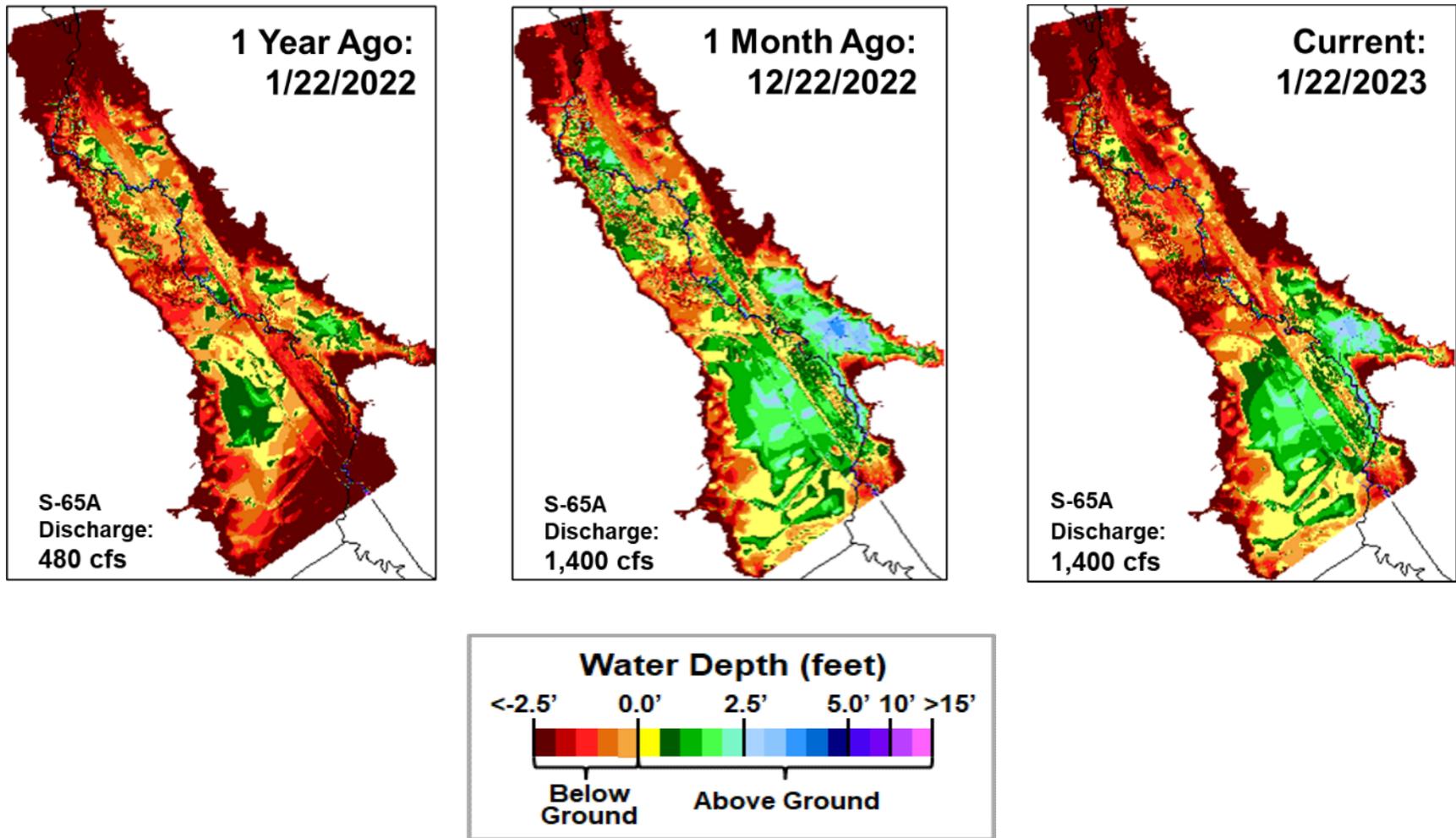
Stage and Discharge Hydrograph (report date: 1/24/2023; data through: 1/22/2023)



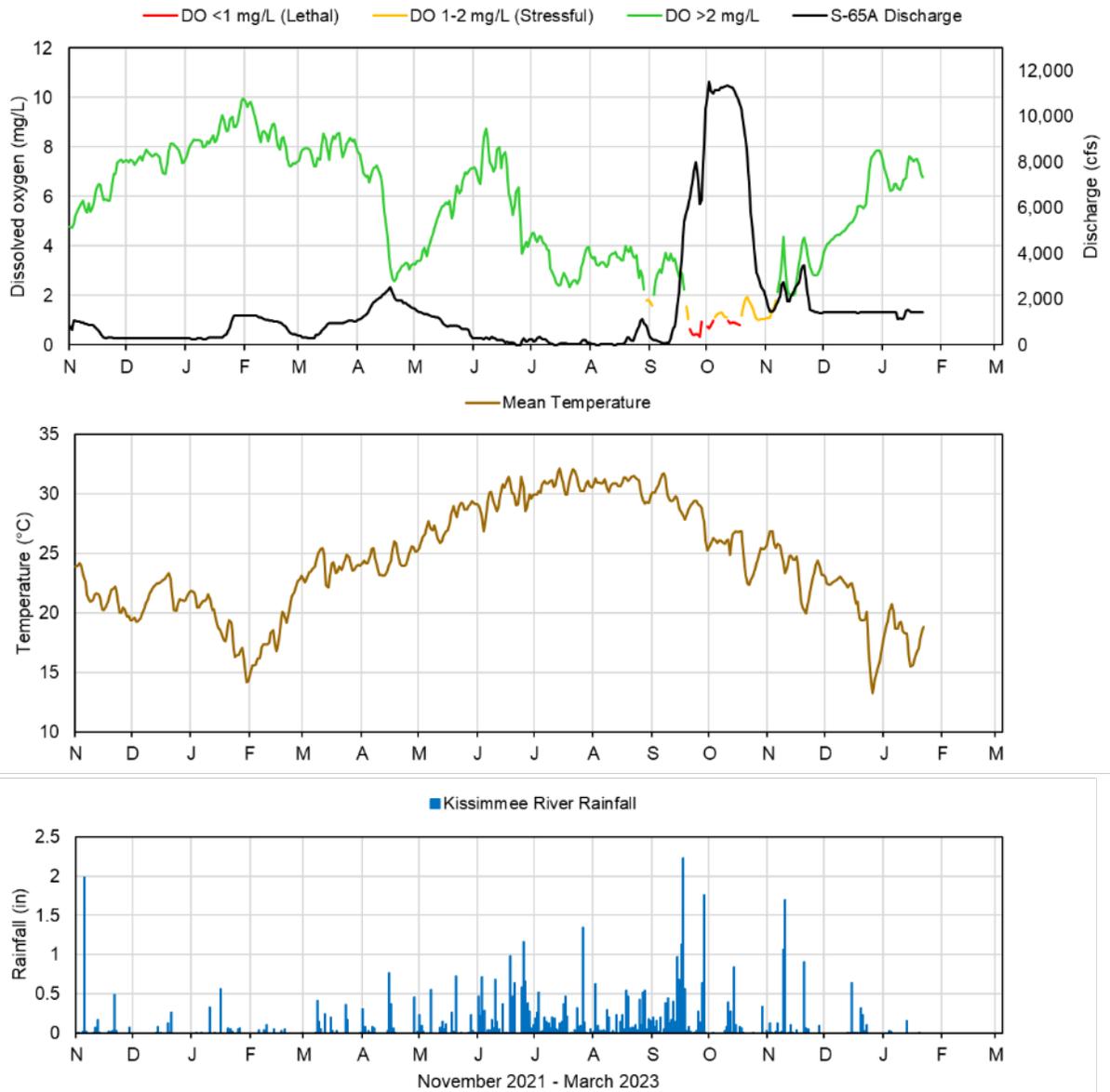
\*River Channel Stage is the average for PC62, KRDR02, KRBN, PC33, and PC11.



Figure KB-4. Kissimmee River stage, discharge and rainfall.



**Figure KB-5.** Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.



Report Date: 1/24/2023; data are through: 1/22/2023



**Figure KB-6.** Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of five stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

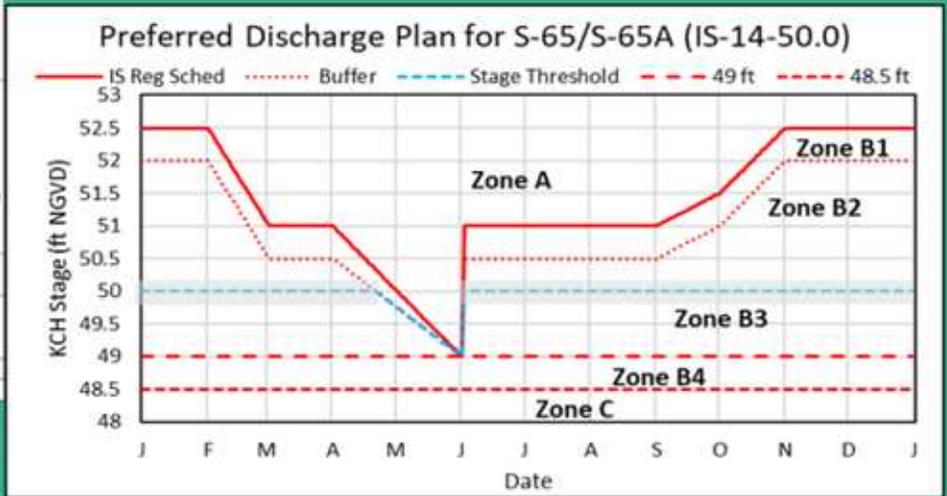
Stage and Discharge Guidance for 2021-2022.		
Zone	KCH Stage (ft NGVD)	S-65/S-65A Discharge*
A	Above regulation schedule line.	Flood control releases as needed with no limits on the rate of discharge change.
B1	In flood control buffer zone (0.5 ft below the schedule line).	Adjust S-65 discharge so that S-65A discharge is between 1400 cfs at the buffer zone line and 3000 cfs at the schedule line.
B2	Between the Flood Control Buffer and the 50.0 ft line.	Adjust S-65 discharge to maintain at least 1400 cfs at S-65A. Use ± 0.2 ft buffer (gray band) above and below the 50.0 ft line to decide when to begin ramping up to 1400 cfs or down to 300 cfs; do not continue reducing discharge if stage rises back to or above the threshold stage line.
B3	Between the 50.0 ft line and 49 ft.	Adjust S-65 discharge to maintain at least 300 cfs at S-65A.
B4	Between 48.5 ft to 49 ft.	Adjust S-65 discharge to maintain S-65A discharge between 0 cfs at 48.5 ft and 300 cfs at 49 ft.
C	Below 48.5 ft.	0 cfs.

\*Changes in discharge should not exceed limits in inset table below.

Table KB-3. Discharge Rate of Change Limits for S65/S65A (revised 1/14/19).		
Q (cfs)	Maximum rate of INCREASE (cfs/day)	Maximum rate of DECREASE (cfs/day)
0-300	100	-50
301-650	150	-75
651-1400	300	-150
1401-3000	600	-600
>3000	1000	-2000



## 2021-2022 Discharge Plan for S-65/S-65A



- Other Considerations
- When possible, limit lake ascension rate in the Jun 1 - Aug 15 window to 0.25 ft per 7 days in Lakes Kissimmee, Cypress, Hatchineha (S-63), East Toho (S-59) and Toho (S-61).
  - If outlook is for extreme dry conditions meet with KB staff to discuss modifications to this plan.

Slide Revised 1/3/2022

Figure KB-7. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

## Lake Okeechobee

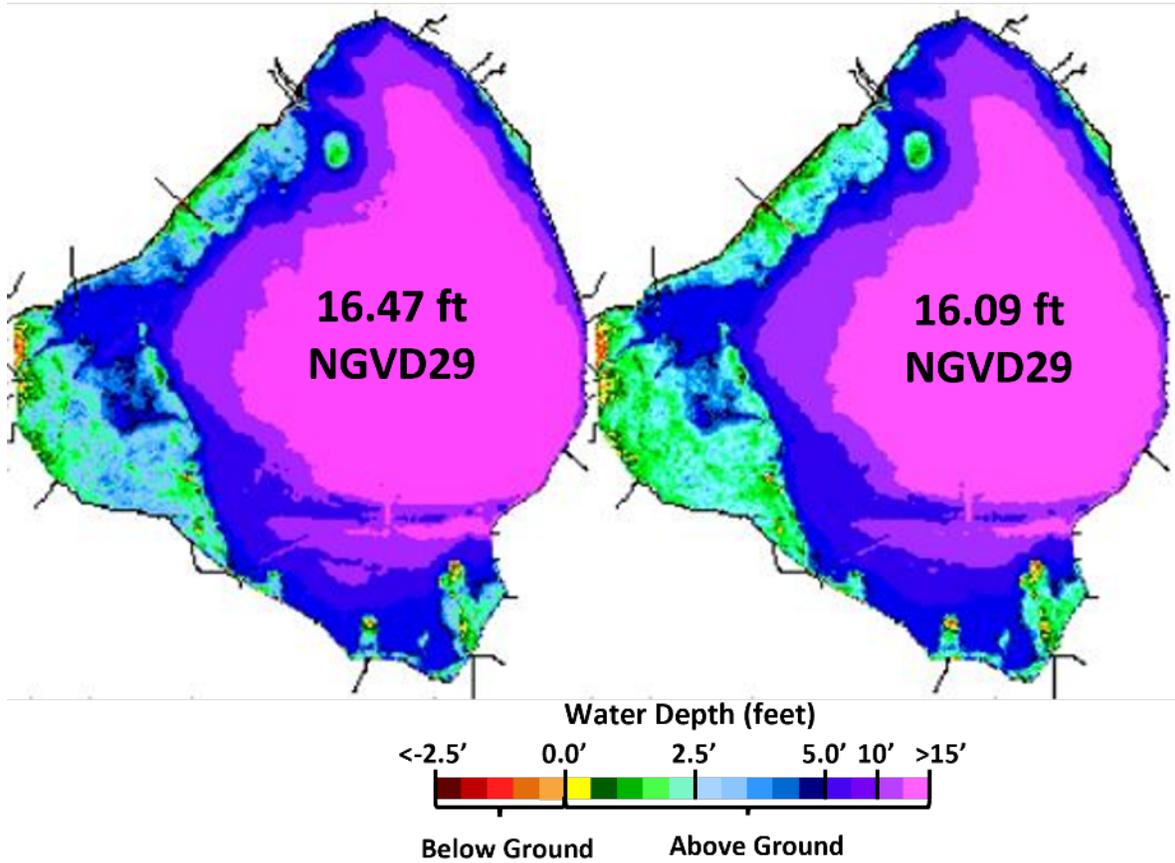
Lake Okeechobee stage was 16.09 feet NGVD on January 22, 2023, which is 0.06 feet lower than the previous week and 0.38 feet lower than a month ago (**Figure LO-1**). Lake stage remained in the Intermediate sub-band (**Figure LO-2**) and was 0.59 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, no rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) were similar to the previous week, going from 1,648 cfs to 1,588 cfs. Average daily outflows (excluding evapotranspiration) were also similar to the previous week going from 2,904 cfs to 2,856 cfs. The highest inflow came from the Kissimmee River (C-38 Canal; 1,337 cfs). Outflows to the west via the S-77 structure averaged 1,428 cfs for the week. Outflows to the south via the S-350 structures averaged 1,202 cfs, average flow at the S-271 structure was 167 cfs and flow to the east via the S-308 structure averaged 58 cfs. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

The most recent satellite image (January 19, 2023) from NOAA's Harmful Algal Bloom Monitoring System showed low bloom potential across much of the pelagic region, but moderate bloom potential in scattered areas along the nearshore, especially in the south end of the Lake (**Figure LO-6**).

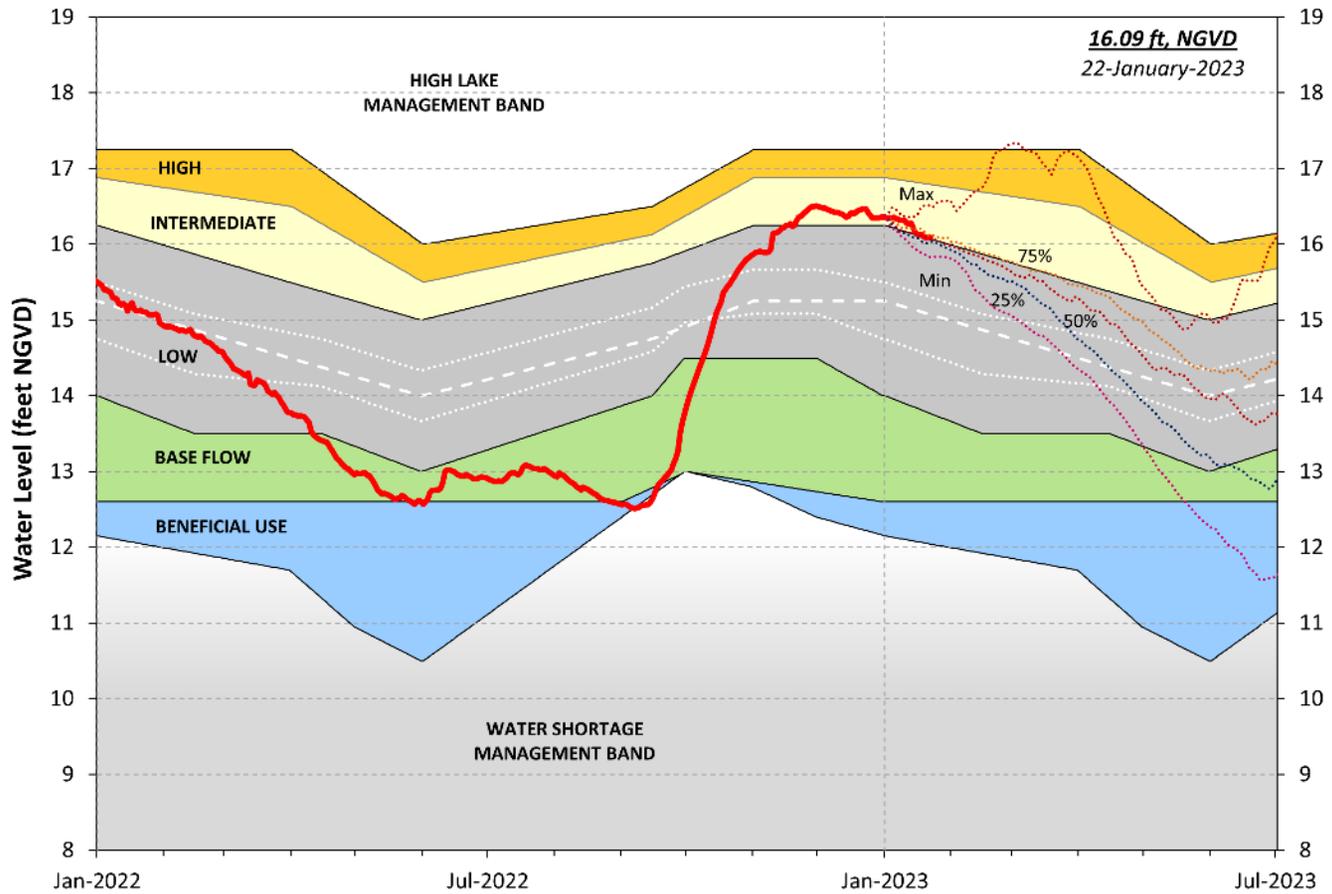
**1 Month Ago:  
12/22/2022**

**Current:  
01/22/2023**



**Figure LO-1.** Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

## Lake Okeechobee Water Level History and Projected Stages



LORS-2008 - Adopted by USACE 28-April-2008

**Figure LO-2.** Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

## Lake Okeechobee Stage vs Ecological Envelope

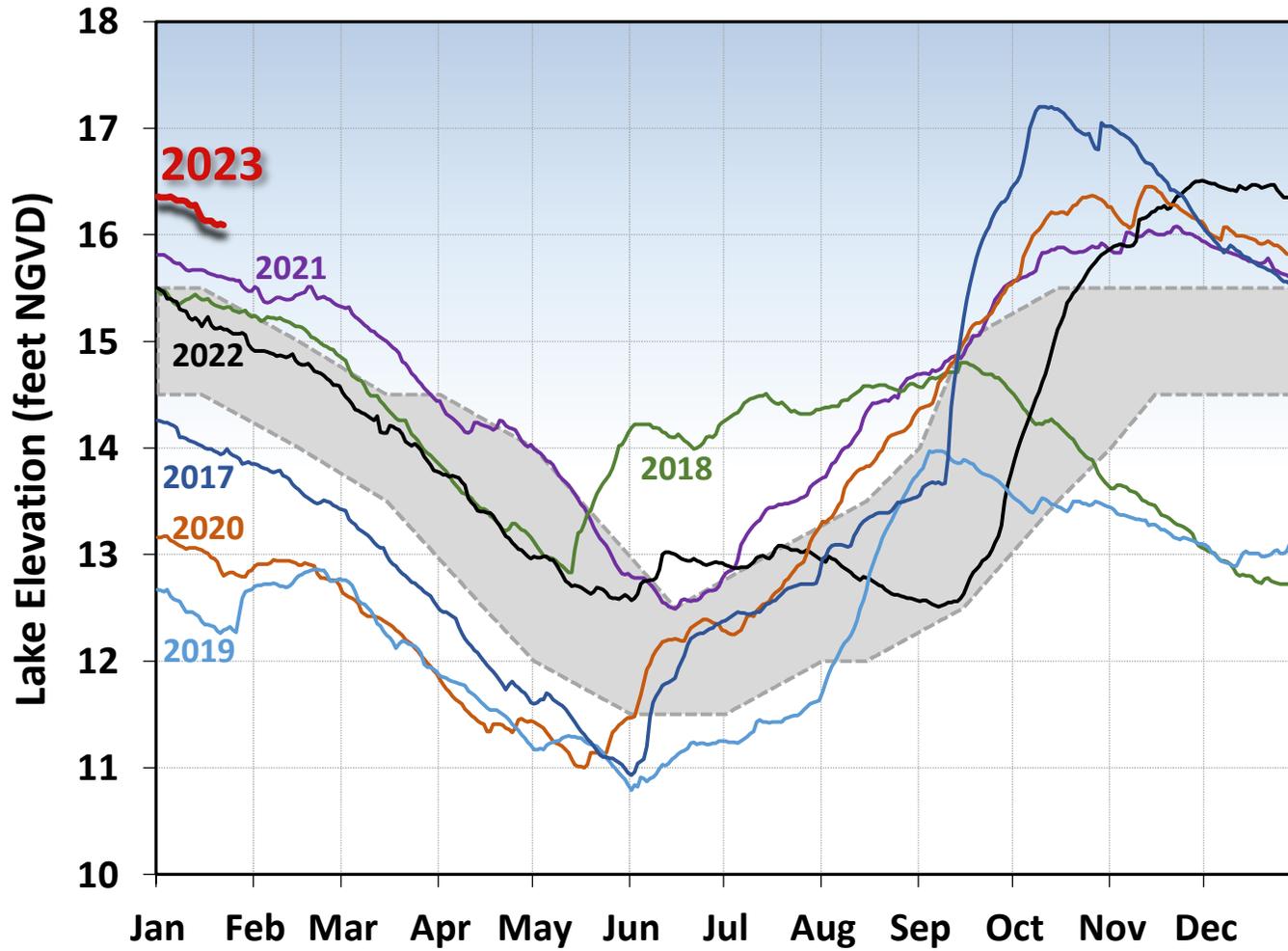
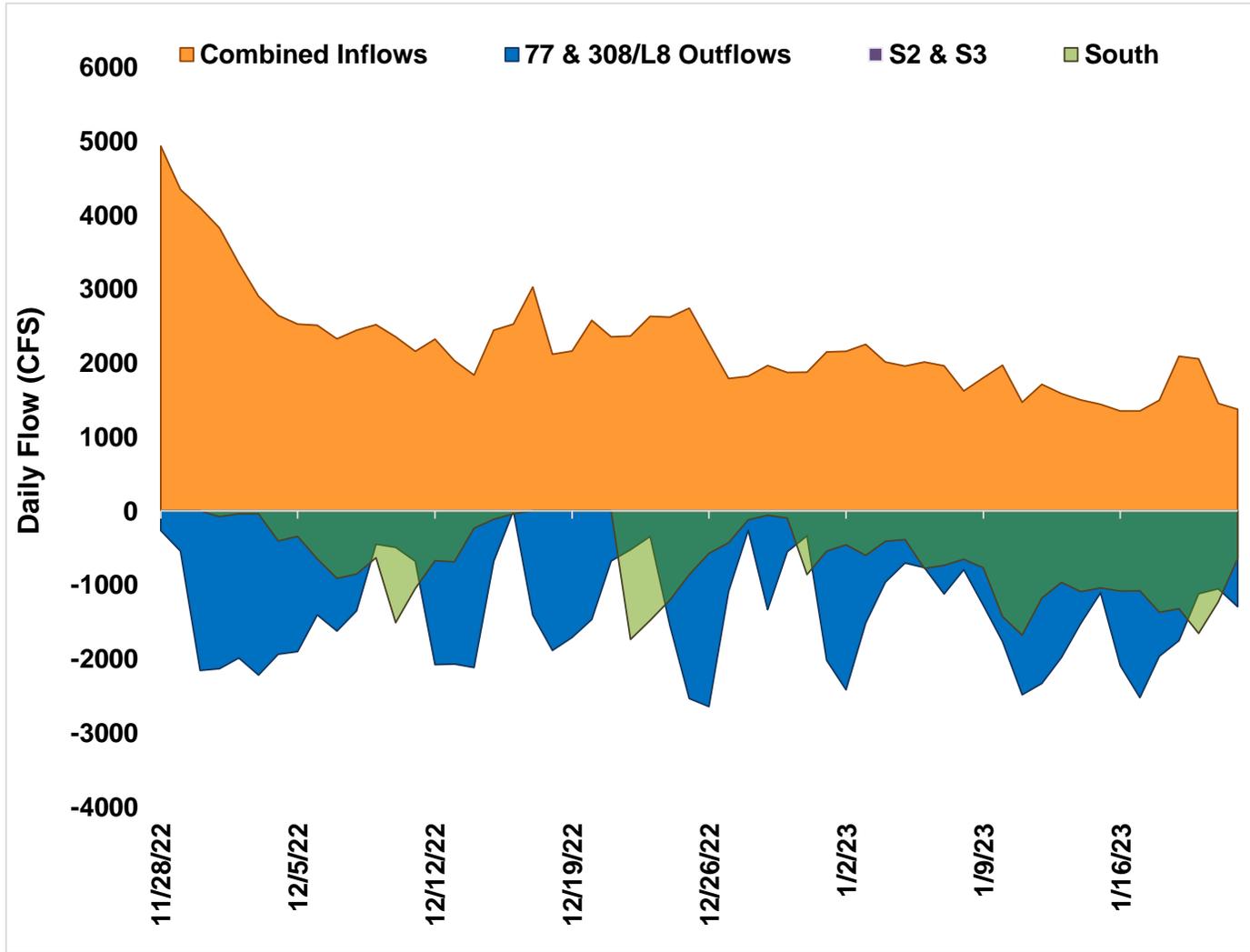


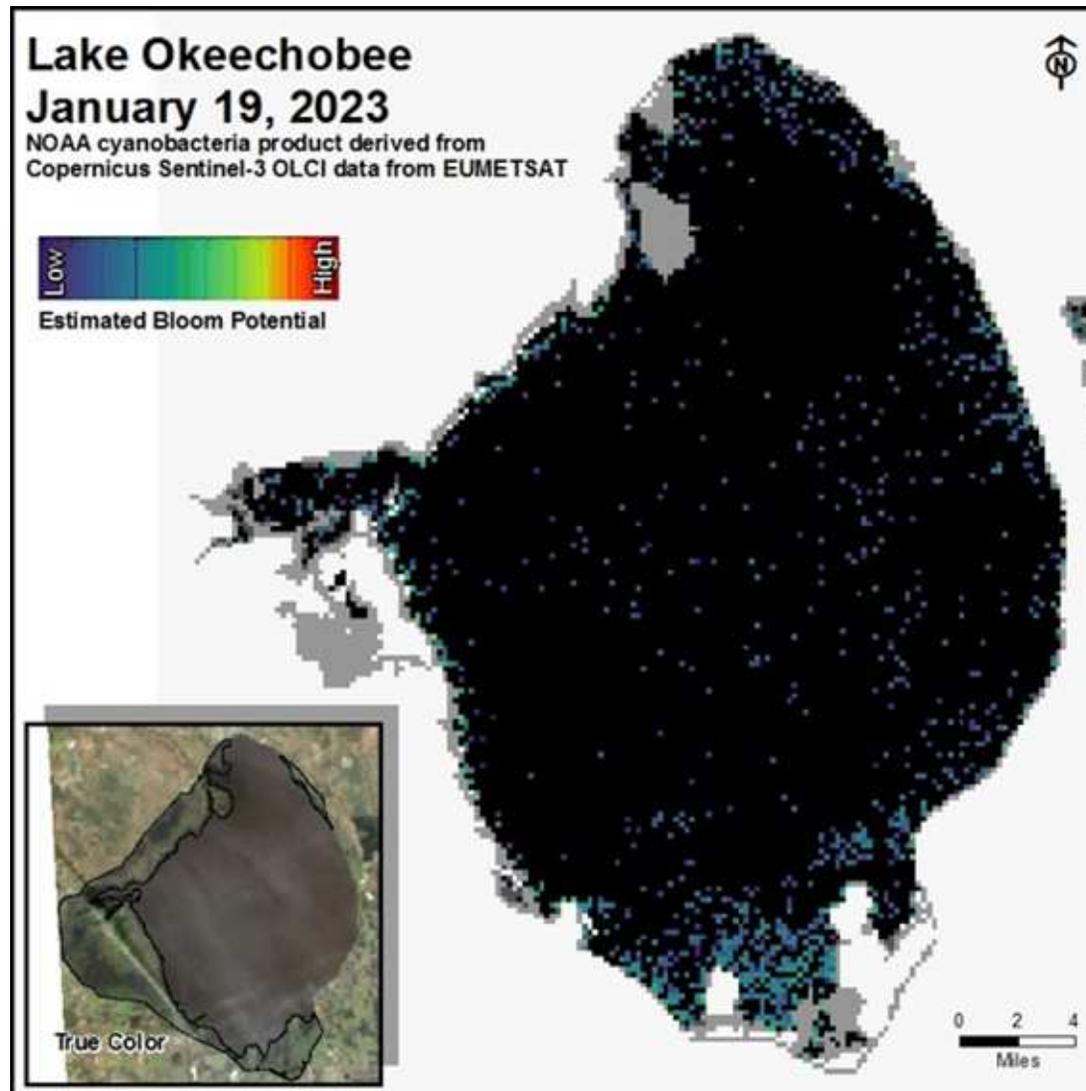
Figure LO-3. The prior seven years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.



**Figure LO-4.** Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 (canal) through the S-308 are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 or C-44 canals are included with outflows. Inflows are shown as positive values; outflows are negative. Outflows through the S-77 (Caloosahatchee) and S-308 (C-44 Canal) structures are based on downstream gauges to include flows to lock openings for navigation.



**Figure LO-5.** Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of January 16 - 22, 2023.



**Figure LO-6.** Cyanobacteria bloom potential on January 19, 2023, based on NOAA’s harmful algal bloom monitoring system. Gray color indicates cloud cover.

## Estuaries

### *St. Lucie Estuary*

Over the past week, mean total inflow to the St. Lucie Estuary was 186 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was 196 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities increased at all sites within the estuary (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 21.8. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute (FWRI) was 0.5 spat/shell for December (**Figure ES-5**).

### *Caloosahatchee River Estuary*

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 2,027 cfs (**Figures ES-6 and ES-7**) and the previous 30-day mean inflow was 2,086 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, salinities remained the same at S-79, decreased at Val I-75 and Ft. Myers, and increased at the remaining sites in the estuary (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Cape Coral, and in the stressed range at Shell Point and Sanibel (**Figure ES-10**). Oyster recruitment data in the CRE are not available at this time due to impacts from Hurricane Ian; FWRI redeployed recruitment collectors in January and will retrieve those samples in February.

Surface salinity at Val I-75 was forecasted for the next two weeks, using an autoregression model (Qiu and Wan, 2013<sup>1</sup>) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1,500 cfs, and a steady release at 2,000 cfs with estimated tidal basin inflows of 89 cfs. Model results from all scenarios predict daily salinity to be 1.5 or lower and the 30-day moving average surface salinity to be 0.5 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-11**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

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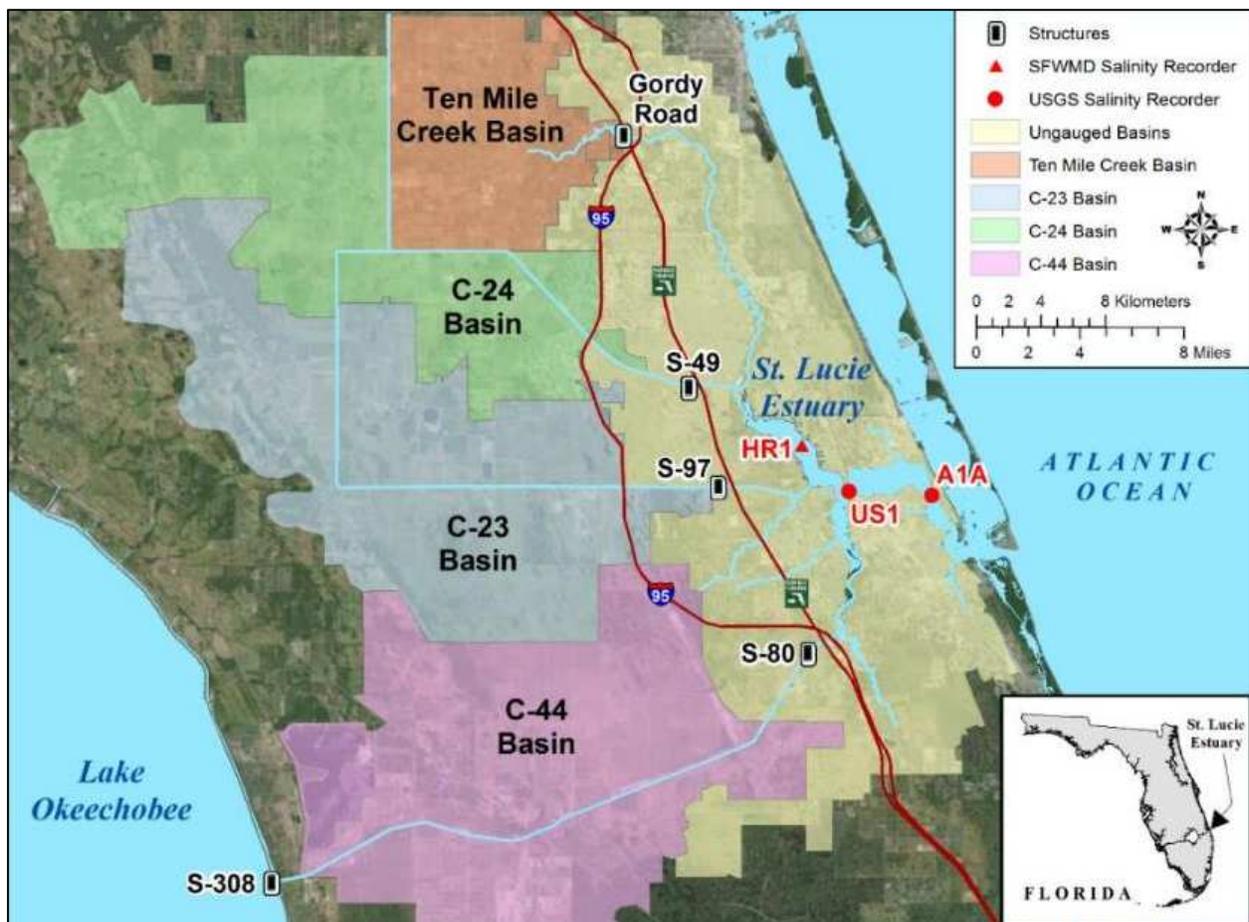
<sup>1</sup> Qiu, C., and Y. Wan. 2013. Time series modeling and prediction of salinity in the Caloosahatchee River Estuary. *Water Resources Research* 49:5804-5816.

## Red Tide

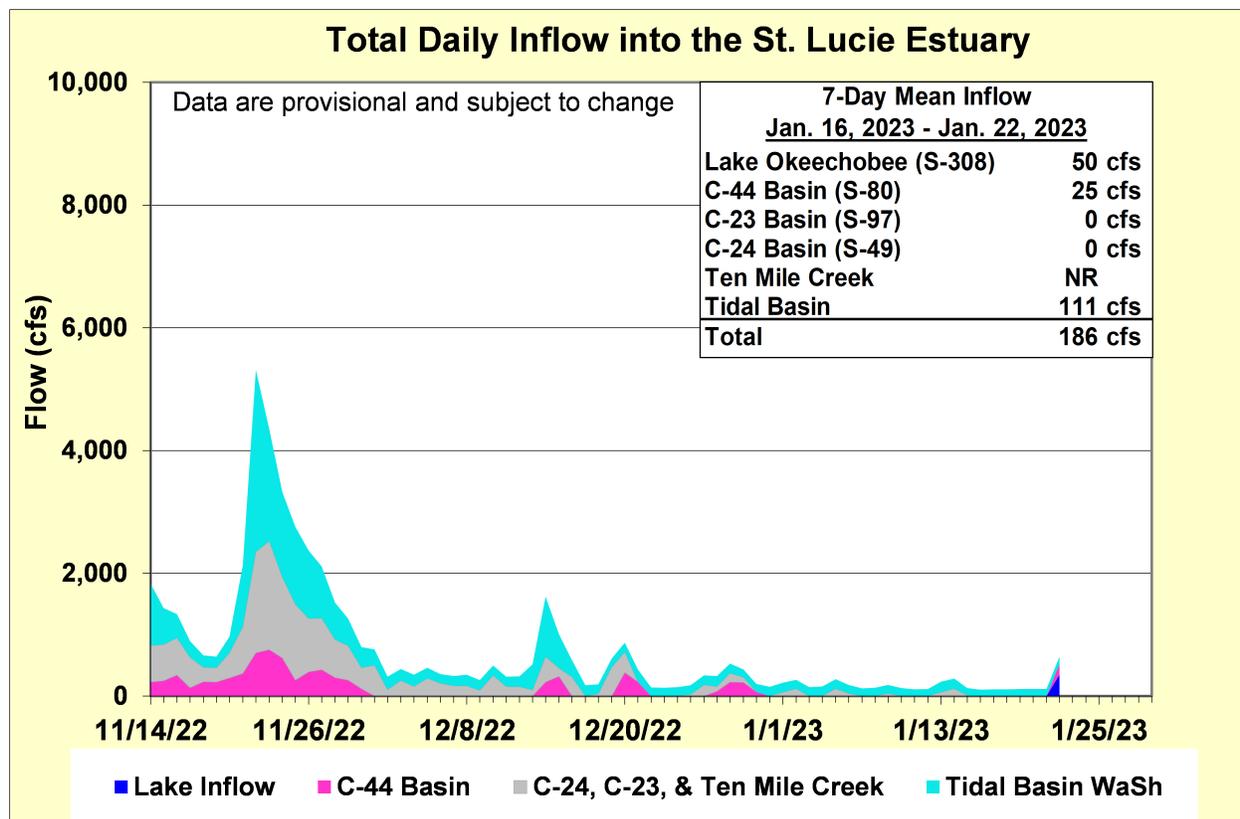
The Florida Fish and Wildlife Research Institute reported on January 20, 2023, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at bloom concentrations in four samples collected from Lee County and four samples collected from Monroe County over the past week. On the east coast, red tide was not observed in samples from Miami-Dade County.

## Water Management Recommendations

Lake stage is in the Intermediate Sub-Band. Tributary conditions are normal. The LORS2008 release guidance suggests up to 4,000 cfs release at S-77 to the Caloosahatchee River Estuary and up to 1,800 cfs release at S-80 to the St. Lucie Estuary.



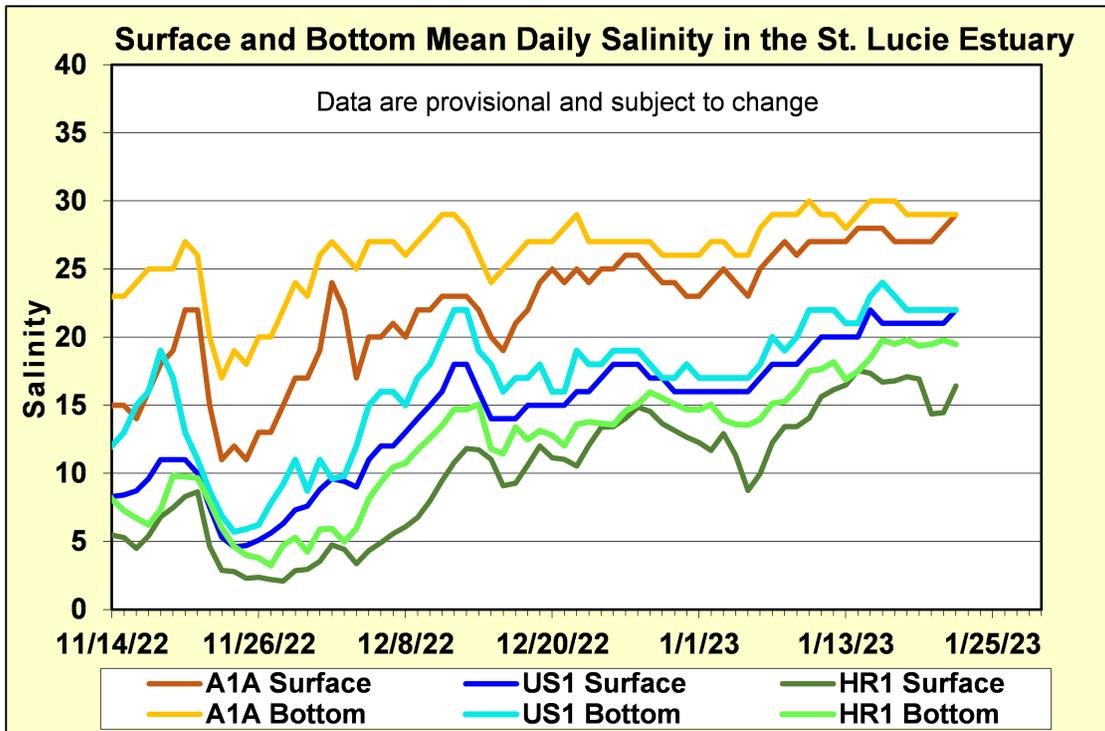
**Figure ES-1.** Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.



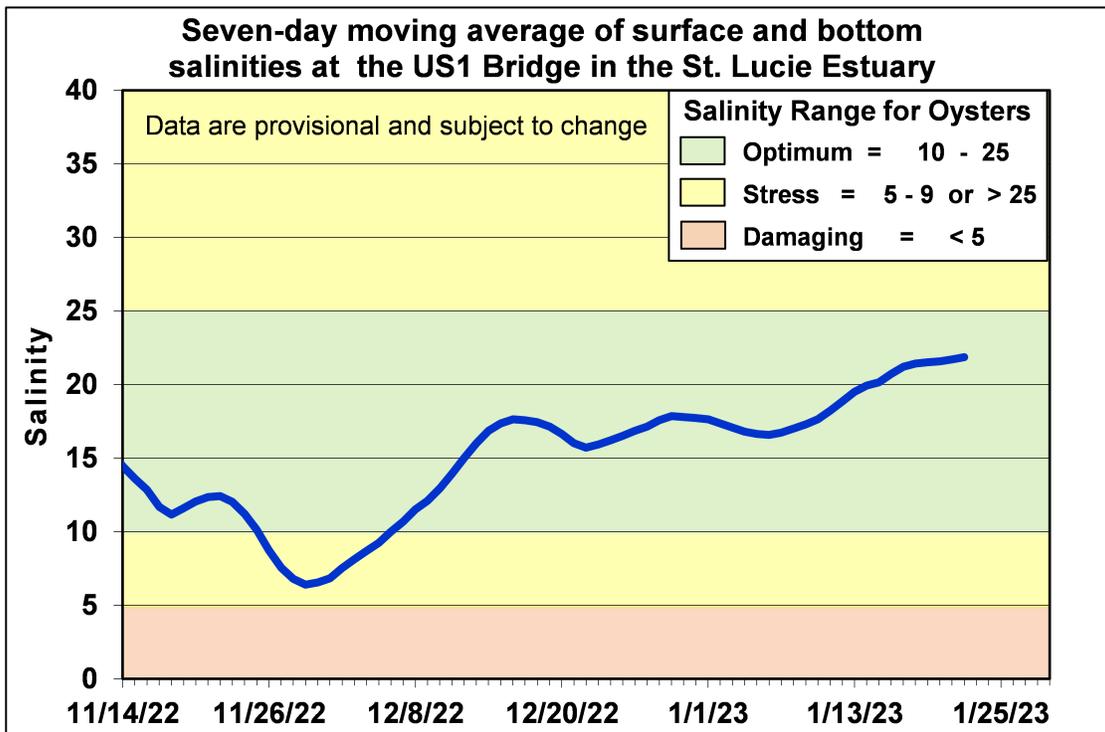
**Figure ES-2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

**Table ES-1.** Seven-day mean salinity at oyster monitoring sites in the St. Lucie Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope reflects the optimum salinity range for adult eastern oysters (*Crassostrea virginica*) in the estuary. Data are provisional.

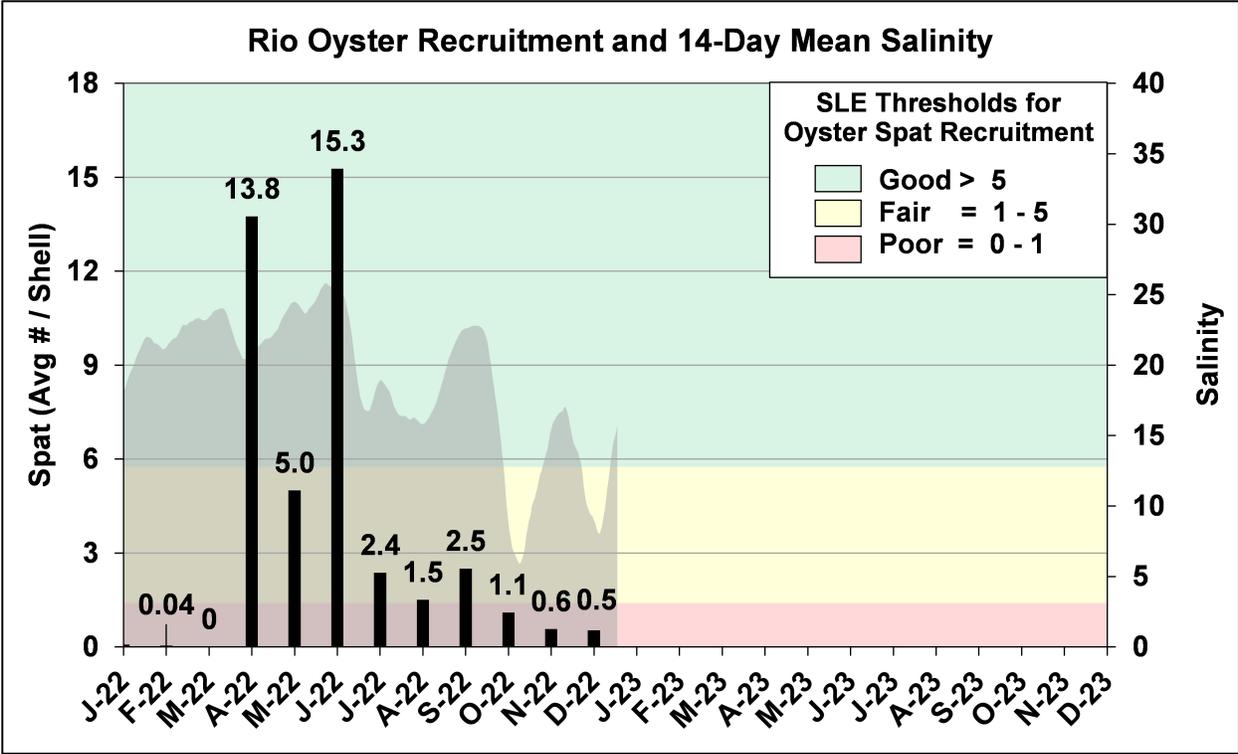
Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	<b>16.1</b> (15.8)	<b>19.6</b> (17.5)	10.0 – 25.0
US1 Bridge	<b>21.1</b> (19.9)	<b>22.4</b> (21.6)	10.0 – 25.0
A1A Bridge	<b>27.6</b> (27.1)	<b>29.3</b> (29.1)	10.0 – 25.0



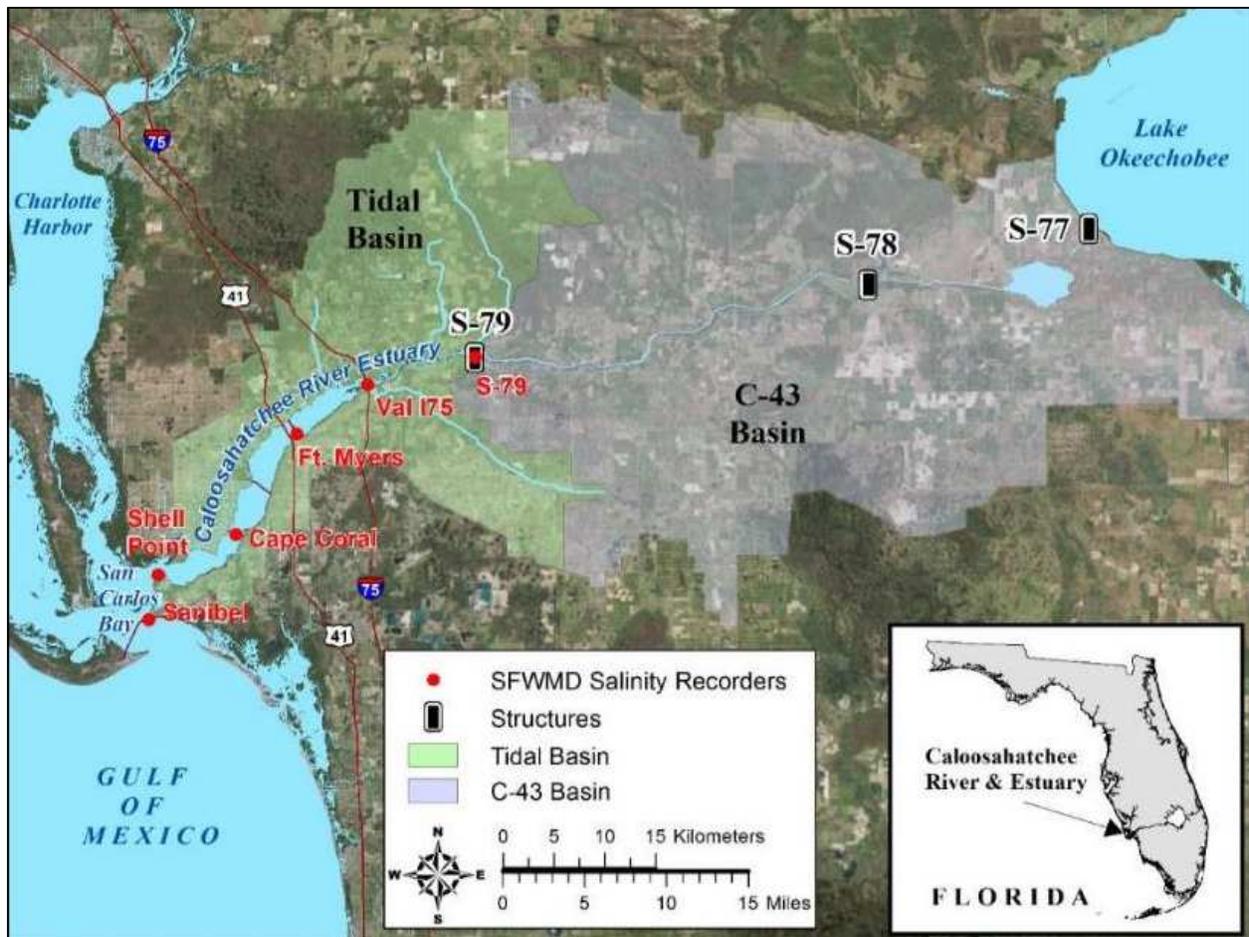
**Figure ES-3.** Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.



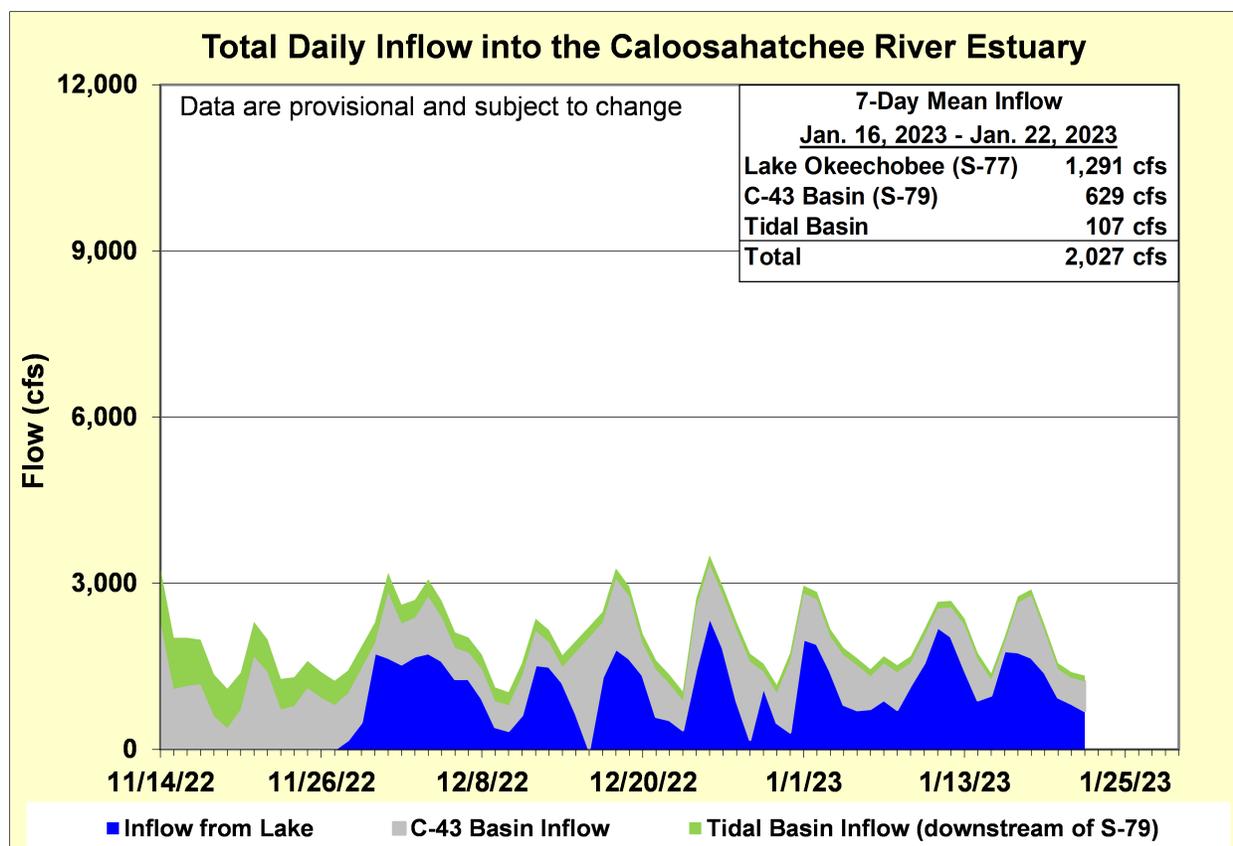
**Figure ES-4.** Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.



**Figure ES-5.** Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.



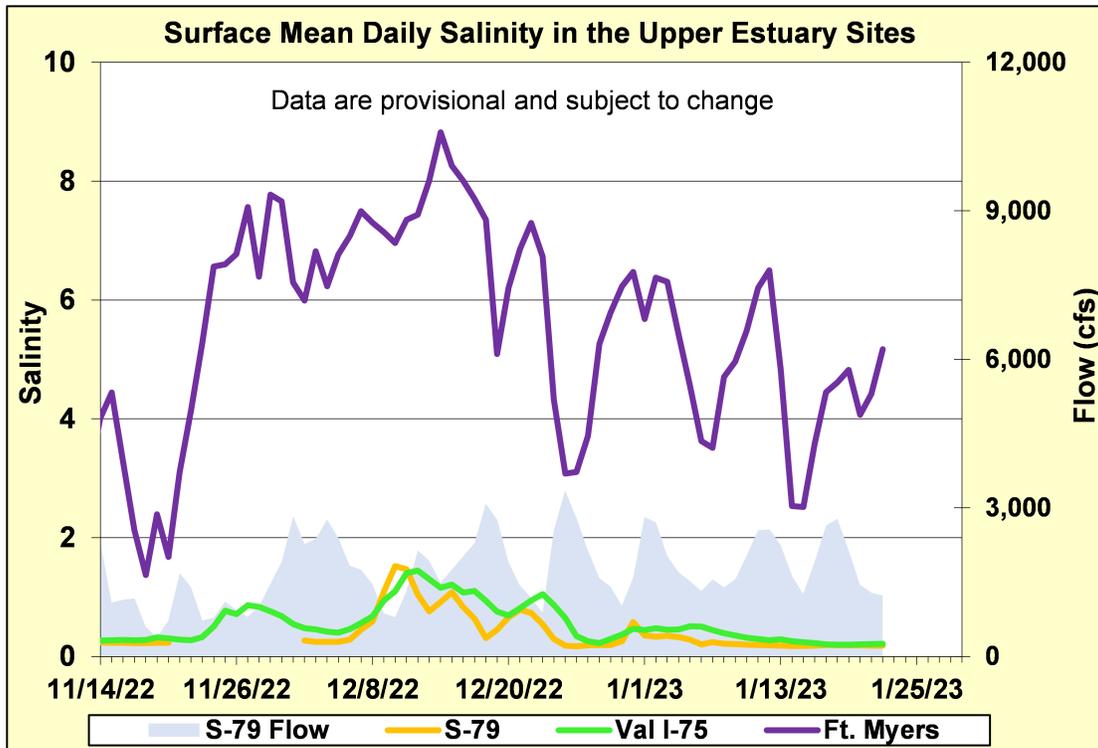
**Figure ES-6.** Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.



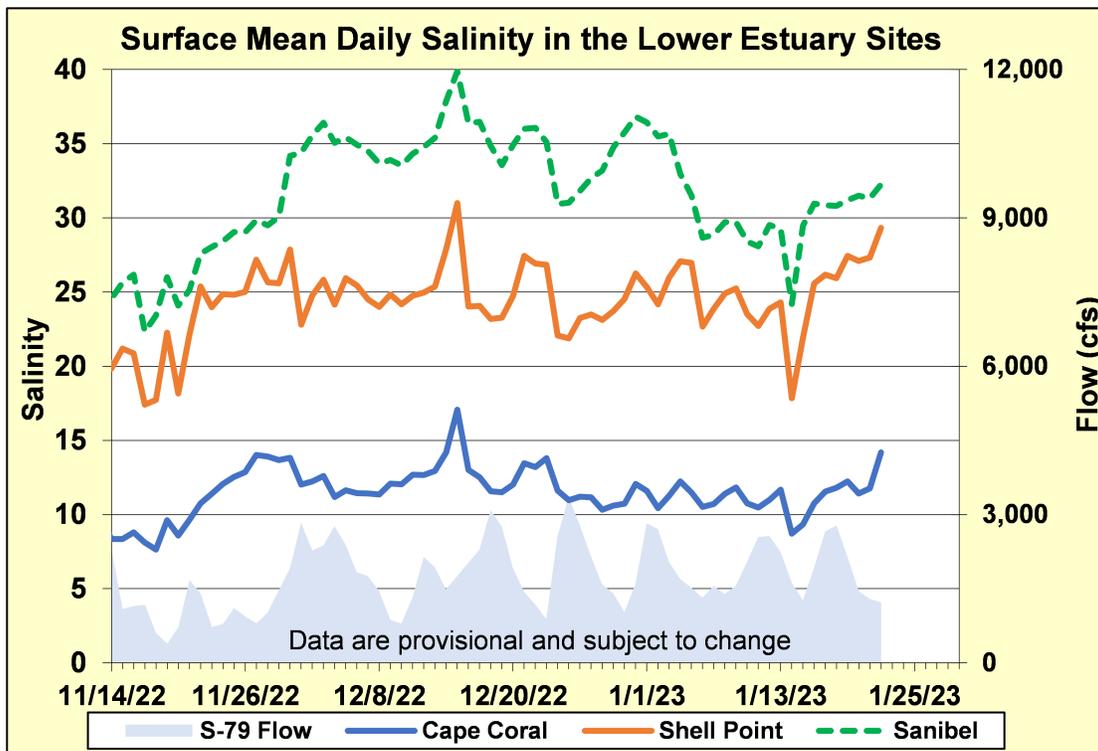
**Figure ES-7.** Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

**Table ES-2.** Seven-day mean salinity at six monitoring sites in the Caloosahatchee River Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope in the upper estuary sites is for the protection of tape grass and the envelope in the lower estuary is the optimum salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

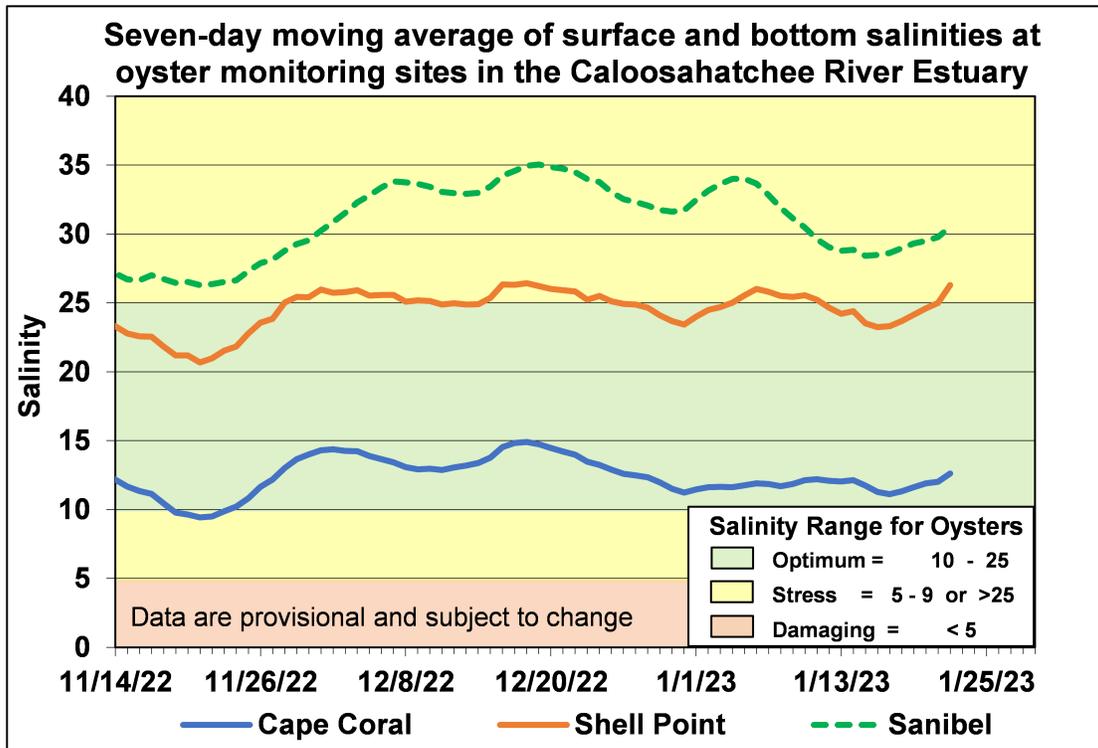
Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	0.0 – 10.0
Val I-75	<b>0.2</b> (0.3)	<b>0.2</b> (0.3)	0.0 – 10.0
Fort Myers Yacht Basin	<b>4.4</b> (4.7)	<b>6.5</b> (6.8)	0.0 – 10.0
Cape Coral	<b>12.0</b> (10.5)	<b>14.8</b> (12.0)	10.0 – 25.0
Shell Point	<b>27.0</b> (22.8)	<b>27.3</b> (23.7)	10.0 – 25.0
Sanibel	<b>31.3</b> (28.4)	<b>30.2</b> (28.6)	10.0 – 25.0



**Figure ES-8.** Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



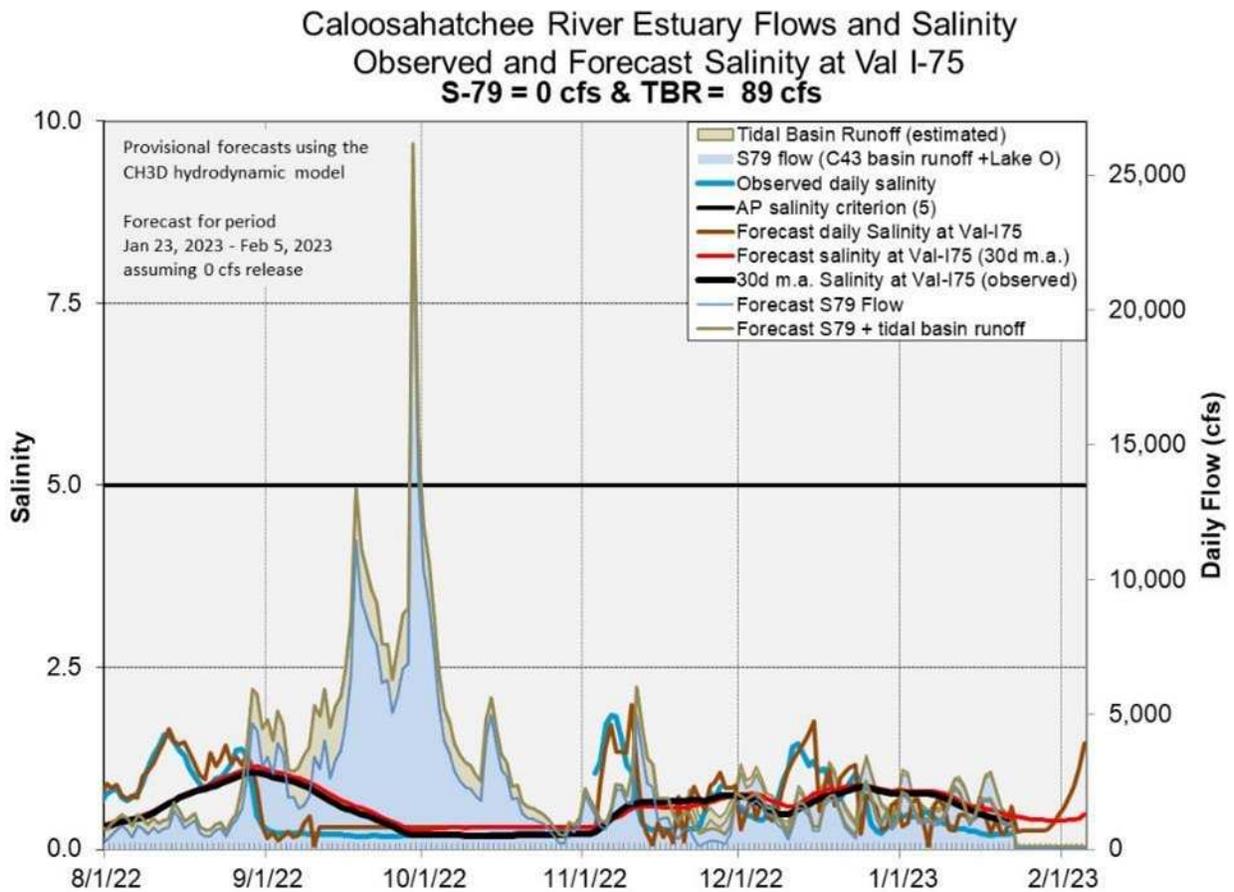
**Figure ES-9.** Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



**Figure ES-10.** Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

**Table ES-3.** Predicted salinity at Val I-75 in the Caloosahatchee River Estuary at the end of the forecast period for various S-79 flow release scenarios.

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
A	0	89	1.5	0.5
B	450	89	0.7	0.4
C	750	89	0.5	0.4
D	1000	89	0.3	0.4
E	1500	89	0.3	0.4
F	2000	89	0.3	0.4



**Figure ES-11.** Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

## Stormwater Treatment Areas

**STA-1E:** STA-1E Western Flow-way is offline for post-construction vegetation grow in. Operational restrictions are in place in STA-1E Central and Eastern Flow-ways for vegetation management activities. Online treatment cells are at or near target stage and vegetation in the flow-ways is stressed and highly stressed. The 365-day phosphorus loading rates (PLRs) are high for the Eastern and Central Flow-way (**Figure S-1**).

**STA-1W:** Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for vegetation management activities. Treatment cells are at target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLR for the Eastern Flow-way is below 1.0 g/m<sup>2</sup>/year. The 365-day PLRs for the Northern and Western Flow-way are high (**Figure S-2**).

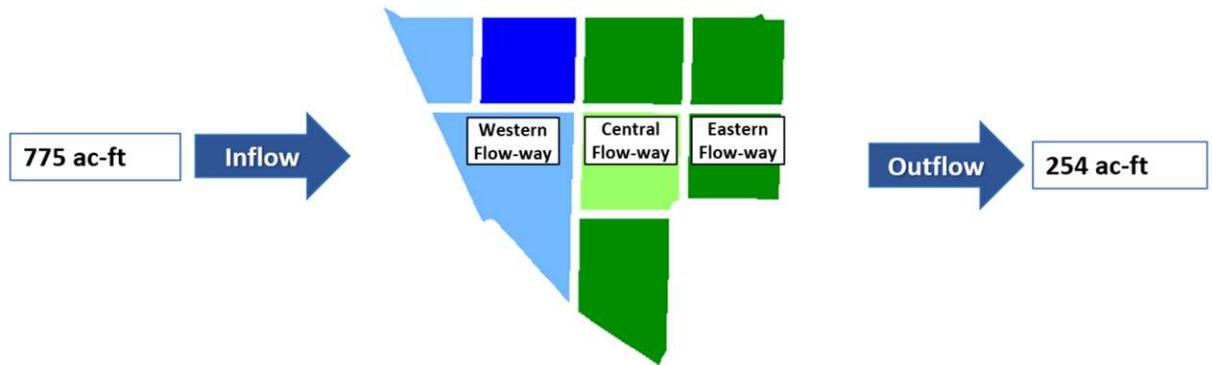
**STA-2:** STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are at or near target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 4 and 5 are below 1.0 g/m<sup>2</sup>/year. The 365-day PLR for Flow-ways 1 and 3 are high (**Figure S-3**).

**STA-3/4:** STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Online treatment cells are at or near above target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for the Central and Western Flow-ways are below 1.0 g/m<sup>2</sup>/year (**Figure S-4**).

**STA-5/6:** All flow-ways in STA-5/6 are online. Most treatment cells are below target stage. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy. The 365-day PLRs for most flow-ways are at or below 1.0 g/m<sup>2</sup>/year, except Flow-ways 3 and 4 which are high (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

**STA-1E Weekly Status Report – 1/16/2023 through 1/22/2023**



STA-1E Flow-Way Status				As of 1/22/2023		STA-1E Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)			7-day	28-day	365-day
				<ul style="list-style-type: none"> <li><span style="color: purple;">■</span> Deep Water Level (&gt; 2.8' above TS)</li> <li><span style="color: blue;">■</span> High Water Level (1.5' – 2.8' above TS)</li> <li><span style="color: lightblue;">■</span> 0.2' – 1.5' above TS</li> <li><span style="color: green;">■</span> Target Stage (TS +/- 0.2')</li> <li><span style="color: lightgreen;">■</span> 0.2' – 0.5' below TS</li> <li><span style="color: yellow;">■</span> 0.5' – 1.0' below TS</li> <li><span style="color: orange;">■</span> Low Water Level (1.0' – 1.2' below TS)</li> <li><span style="color: red;">■</span> Extreme Low Water (&gt; 1.2' below TS)</li> </ul>					
Eastern	←  →	1.0	Vegetation management						
Central	←  →	1.0	Vegetation rehabilitation						
Western	Offline, post-construction grow in starting 3/28/2022								
Total Inflow, ac-ft							775	2,173	129,031
--Lake Inflow, ac-ft							100	N/A	2,800
Total Outflow, ac-ft							254	950	101,688
Inflow Conc., ppb							52	58	113
Outflow Conc., ppb							19	16	25
Includes Preliminary Data									

**Figure S-1.** STA-1E Weekly Status Report

STA-1W Weekly Status Report – 1/16/2023 through 1/22/2023



STA-1W Flow-Way Status

Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
Northern	← →		Vegetation management
Western	← →		Vegetation management
Eastern	← →		Vegetation management
Cell 7	← →	N/A	Online
Cell 8	← →	N/A	Construction

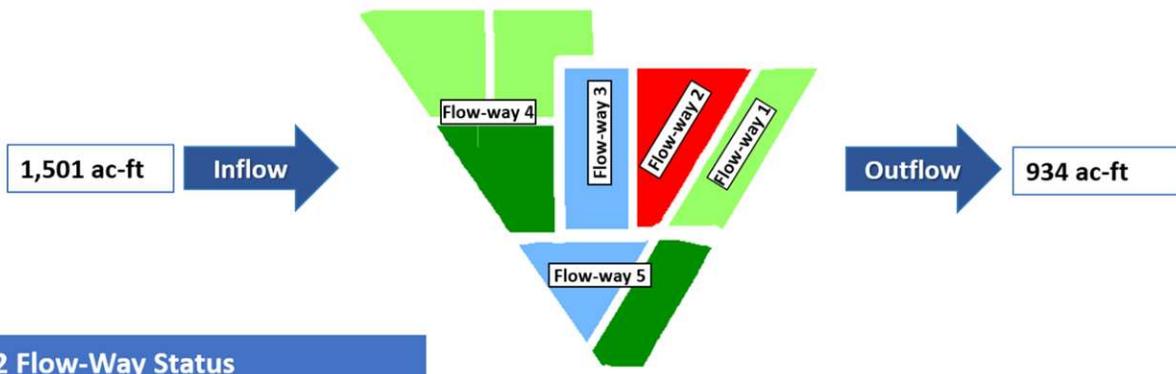
As of 1/22/2023	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	0.2' – 0.5' below TS
	0.5' – 1.0' below TS
	Low Water Level (1.0' – 1.2' below TS)
	Extreme Low Water (> 1.2' below TS)

STA-1W Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	1,313	1,313	143,794
--Lake Inflow, ac-ft	1,000	N/A	2,600
Total Outflow, ac-ft	0	45	145,994
Inflow Conc., ppb	119	119	197
Outflow Conc., ppb	N/A	16	20
Includes Preliminary Data			

Figure S-2. STA-1W Weekly Status Report

**STA-2 Weekly Status Report – 1/16/2023 through 1/22/2023**



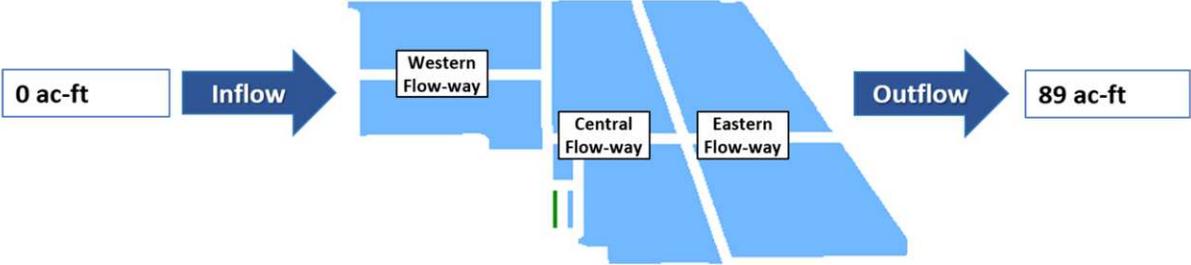
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small>	365-day P Loading Rate <small>(below 1.0 g P /m<sup>2</sup>/yr is optimal)</small>	Online / Offline / Restrictions
1			Online
2	Offline, post-construction grow in starting 1/23/2023		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 1/22/2023	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	0.2' – 0.5' below TS
	0.5' – 1.0' below TS
	Low Water Level (1.0' – 1.2' below TS)
	Extreme Low Water (> 1.2' below TS)

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	1,501	4,159	311,110
--Lake Inflow, ac-ft	1,500	N/A	26,400
Total Outflow, ac-ft	934	2,093	331,044
Inflow Conc., ppb	38	33	114
Outflow Conc., ppb	17	20	30
Includes Preliminary Data			

**Figure S-3.** STA-2 Weekly Status Report

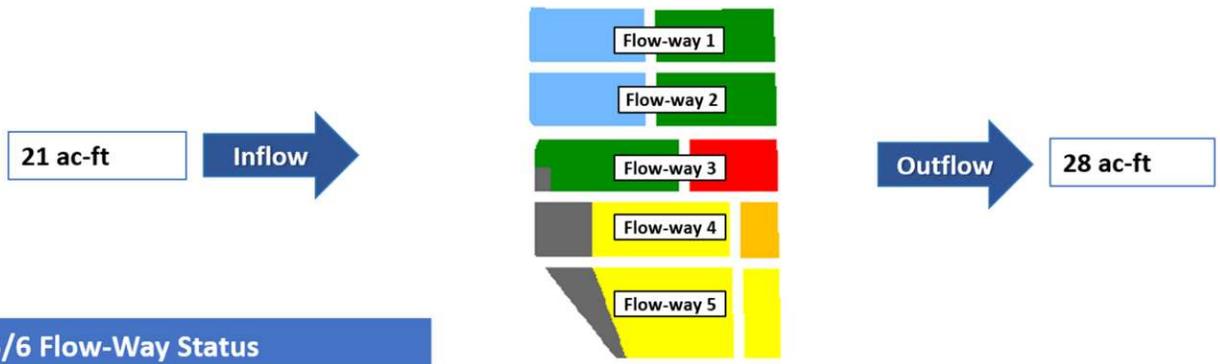
**STA-3/4 Weekly Status Report – 1/16/2023 through 1/22/2023**



STA-3/4 Flow-Way Status				As of 1/22/2023		STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small>	365-day P Loading Rate <small>(below 1.0 g P /m<sup>2</sup>/yr is optimal)</small>	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)			7-day	28-day	365-day
Eastern	Offline, vegetation management drawdown as of 3/1/2021			<div style="background-color: purple; width: 10px; height: 10px; display: inline-block;"></div> Deep Water Level (> 2.8' above TS) <div style="background-color: blue; width: 10px; height: 10px; display: inline-block;"></div> High Water Level (1.5' – 2.8' above TS) <div style="background-color: lightblue; width: 10px; height: 10px; display: inline-block;"></div> 0.2' – 1.5' above TS <div style="background-color: green; width: 10px; height: 10px; display: inline-block;"></div> Target Stage (TS +/- 0.2') <div style="background-color: lightgreen; width: 10px; height: 10px; display: inline-block;"></div> 0.2' – 0.5' below TS <div style="background-color: yellow; width: 10px; height: 10px; display: inline-block;"></div> 0.5' – 1.0' below TS <div style="background-color: orange; width: 10px; height: 10px; display: inline-block;"></div> Low Water Level (1.0' – 1.2' below TS) <div style="background-color: red; width: 10px; height: 10px; display: inline-block;"></div> Extreme Low Water (> 1.2' below TS)	Total Inflow, ac-ft	0	14	299,657	
Central			Online		--Lake Inflow, ac-ft	0	N/A	4,300	
Western			Online		Total Outflow, ac-ft	89	83	293,340	
					Inflow Conc., ppb	N/A	N/A	93	
					Outflow Conc., ppb	22	23	16	
						Includes Preliminary Data			

**Figure S-4.** STA-3/4 Weekly Status Report

**STA-5/6 Weekly Status Report – 1/16/2023 through 1/22/2023**



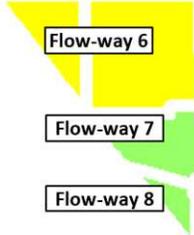
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1	← →		Online
2	← →		Online
3	← →		Online
4	← →		Online
5	← →		Online

As of 1/22/2023
Stage Based: Relative to Target Stage (TS)
Deep Water Level (> 2.8' above TS)
High Water Level (1.5' – 2.8' above TS)
0.2' – 1.5' above TS
Target Stage (TS +/- 0.2')
0.2' – 0.5' below TS
0.5' – 1.0' below TS
Low Water Level (1.0' – 1.2' below TS)
Extreme Low Water (> 1.2' below TS)

STA-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	21	1,082	154,476
--Lake Inflow, ac-ft	0	N/A	0
Total Outflow, ac-ft	28	984	149,196
Inflow Conc., ppb	256	127	286
Outflow Conc., ppb	31	13	40
Includes Preliminary Data			

**Figure S-5.** STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

STA-5/6 Weekly Status Report – 1/16/2023 through 1/22/2023



STA-5/6 Flow-Way Status				As of 1/22/2023	
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)	
				Deep Water Level (> 2.8' above TS)	High Water Level (1.5' – 2.8' above TS)
6	←-----→		Online	0.5' – 1.0' below TS	Target Stage (TS +/- 0.2')
7	←-----→		Online	0.2' – 0.5' below TS	Target Stage (TS +/- 0.2')
8	←-----→		Online	0.5' – 1.0' below TS	Target Stage (TS +/- 0.2')

**Figure S-6.** STA-5/6 Weekly Status Report (Flow-ways 6 – 8)

## Basic Concepts and Definitions for STA Weekly Status Report

- **Inflow:** Sum of flow volume at all inflow structures to an STA.
- **Lake Inflow:** Portion of the STA total inflow volume that originates from Lake Okeechobee.
- **Outflow:** Sum of flow volume at outflow structures from an STA.
- **Total Phosphorus (TP):** Total mass of phosphorus in all its forms; including particulate, dissolved, etc.
- **Inflow Concentration:** TP concentration is the mass of TP in micrograms per liter of water,  $\mu\text{g/L}$  or ppb. Inflow concentration refers to the flow-weighted mean TP from all inflow structures over a period of time.
- **Outflow Concentration:** The flow-weighted mean TP from all outflow structures over a period of time. The outflow concentration represents the reduction of inflow TP achieved by STA treatment of the inflow water.
- **WQBEL:** The STA outflow concentration that is required upon completion of the Restoration Strategies projects by December 2025. The outflow concentration shall not exceed 13 ppb as an annual flow weighted mean in more than 3 out of 5 water years on a rolling basis and shall not exceed 19 ppb as an annual flow weighted in any water year.
- **Flow-Way (FW):** One or more treatment cells connected in series. Cells typically have emergent aquatic vegetation (EAV) in the front portion of the flow-way followed by a mix of EAV and submerged aquatic vegetation (SAV)
- **Vegetation Status:** Healthy means the vegetation condition is good and will allow the STA to perform as designed. Stressed means the vegetation is showing signs of poor health, such as browning or areas of vegetation die-off, or the cell contains undesirable vegetation such as floating exotic vegetation requiring treatment. The TP reduction capability of the STA is affected when the vegetation condition is poor.
- **Phosphorus Loading Rate (PLR):** Mass of inflow TP in grams, divided by total treatment area of STA in square meters, per year. In general, a 365-day value of less than 1.0 is needed for an STA to perform optimally. A PLR of 2.0 is considered very high and a PLR of 3.0 is considered extremely high. The TP reduction capability of the STA is affected when the PLR is high, very high and extremely high.
- **Online:** Online status means the FW can receive and treat inflow.
- **Online with Restriction:** The FW can receive and treat inflow, but the amount of flow or water level may be limited temporarily. For example, a vegetation rehabilitation effort may require reduced flows through an area while the new plants are establishing, or nesting by protected species may require a certain water level not to be exceeded.
- **Offline:** The FW is unable to receive and treat inflow due to repairs, construction, or other prohibitive reasons.
- **Depth:** Difference between the average surface water level in a cell and the average ground elevation in that cell. Target depths, or depths between flow events, are between 1.25 ft to 1.5 ft. As depth approaches or drops below zero, an increasing percentage of the cell is considered dry and STA conditions deteriorate. An increase in depth above target depth is expected with increasing flow. However, as depth increases much above the target depth and is sustained over a period of time, it can be detrimental to vegetation health and overall STA treatment performance.
- **Note:** The data provided in this summary report were developed using a combination of provisional and quality-assured flow and water quality data. In some cases, best professional judgment was used to estimate missing data and revise questionable data. Values provided are not considered final but are appropriate for use in STA operational decision-making.

## **Everglades**

### ***Water Conservation Area Regulation Schedules***

WCA-1: Stage at the 1-8C receded over the week in parallel with schedule. The average on Monday was 0.18 feet above the falling Zone A1 regulation line. WCA-2A: Stage recession at the 2-17 gauge slowed last week. The average on Monday was 0.85 feet above the falling regulation line. WCA-3A: Over the last week the Three Gauge Average stage continues to recede faster than the slope of the regulation line. The average stage was 0.52 feet below the falling regulation line on Monday. WCA-3A North: At gauge 62 (Northwest corner) stage continues a steep recession, the average on Monday was 0.84 feet below the Upper schedule line (**Figures EV-1** through **EV-4**).

### ***Water Depths***

The SFWDAT tool illustrates current stages in the EPA are falling in most of the major basins; with NESRS, southern WCA-1 and the upper reaches of the L-67s retaining stage. WCA-3A continues to dry down from the northwest to the southeast. There is an expansion in extent for areas with the potential for stages to have moved to ground surface, with nearly one-half of that sub basin now in the 0.0' to 0.5' category. Connectivity in the sloughs of ENP remains but is lessening to the west. Comparing current WDAT water depths to one month ago conditions within the EPA are generally shallower with southern WCA-2A and eastern WCA-3A significantly so. Looking back a year ago, most of WCA-3A and western ENP is slightly deeper; not significantly so in extreme northeast, as we have seen in previous model output (**Figure EV-5** and **Figure EV-6**). Comparing current conditions to the 20-year average on January 22: Conditions are above average in northeastern WCA-3A and below in the southeastern WCA-3A; significantly above average in WCA-3B, northeastern SRS and portions of WCA-1 (**Figure EV-7**).

### ***Taylor Slough and Florida Bay***

Nearly all stations in Taylor Slough and Florida Bay received no rain over the past week (Monday-Sunday) based on the 18 gauges used in this report. Only four sites received any rain, ranging from 0.01 inches at Taylor Slough Bridge (TSB) in Taylor Slough as well as Joe Bay and Trout Creek in the eastern nearshore region to 0.04 inches Manatee Bay. Taylor Slough stages decreased between -0.16 feet and -0.05 feet (**Figure EV-8** and **Figure EV-9**). Taylor Slough water levels remain above the historical average for this time of year by +4.8 inches compared to before the Florida Bay initiative (starting in 2017), a decrease of -0.7 inches from last week.

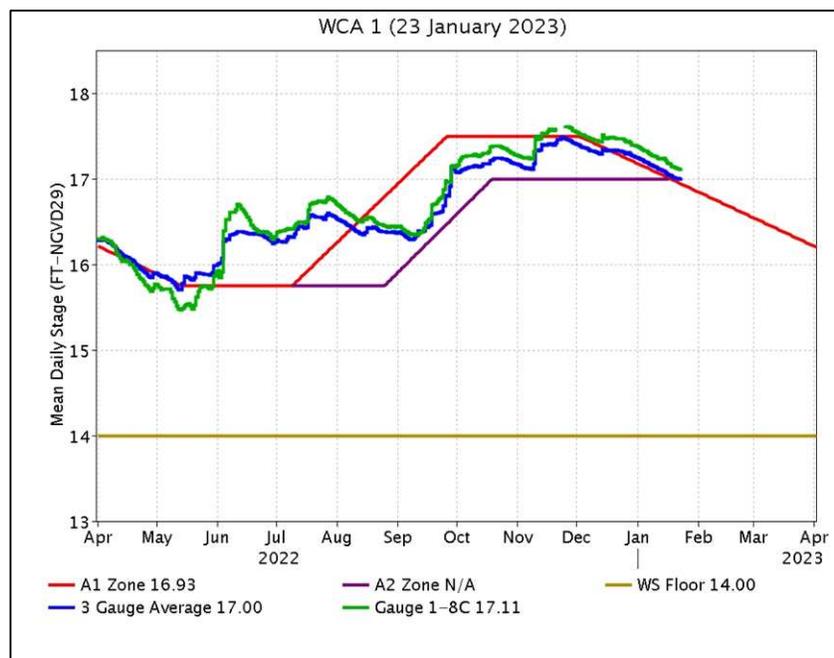
Average Florida Bay salinity was 29.3, an increase of +4.0 from last week. Salinity changes ranged from a decrease of -0.6 at Johnson Key (JK) in the western bay to an increase of +14.6 in Garfield Bight (GB) in the western nearshore region (**Figure EV-8**). Nearly all salinity increases occurred in nearshore locations, corresponding with mostly negative and low magnitude creek flow. As of 1/22, salinities are above the IQR in the Eastern and Central Bay and within the IQR in the Western region (**Figure EV-10**). Florida Bay salinity is +2.6 above its historical average for this time of year, up +4.0 from last week.

## Water Management Recommendations

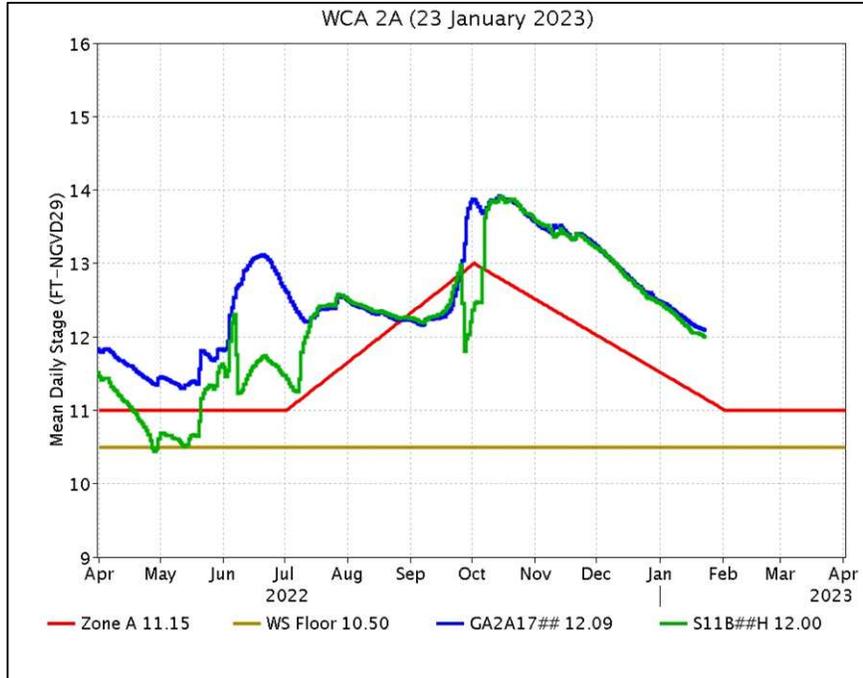
We recommend continuing discussion and the utilization of strategies that prevent further degradation of WCA3A North. Conserving water in this region will most likely prove critical for the upcoming wading bird nesting season. Optimizing the volume of water currently available to be discharged into the northern perimeter of WCA-3A will benefit the ecology of that region as conditions transition to a dry season predicted to be drier than average. Maintaining a moderate rate of stage change within the marshes of WCAs, avoiding abrupt changes in water depth and conserving water north in the system has an ecological benefit. When water is available discharge downstream through Taylor Slough. Individual regional recommendations can be found in **Table EV-2**.

**Table EV-2.** Previous week’s rainfall and water depth changes in Everglades basins.

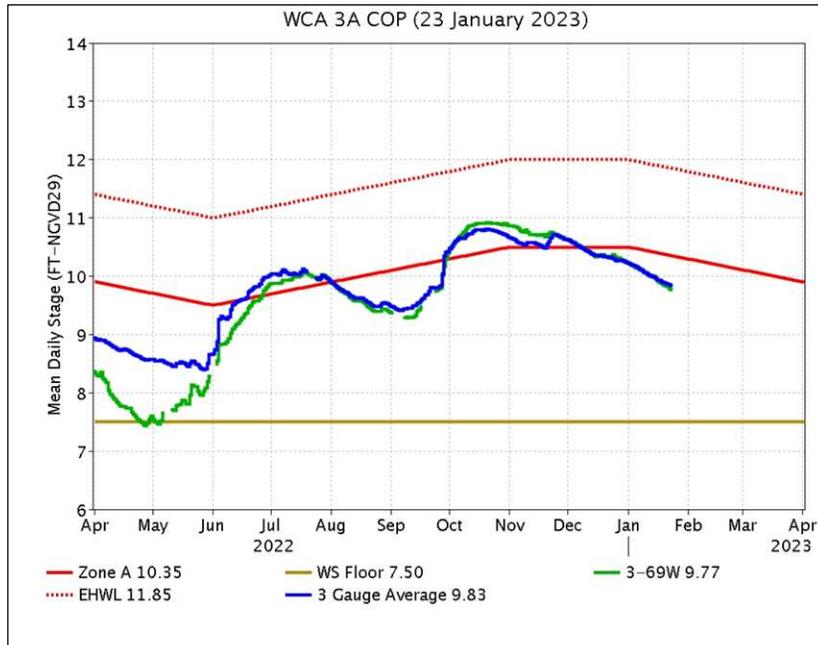
Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	0.00	-0.07
WCA-2A	0.00	-0.10
WCA-2B	0.00	-0.07
WCA-3A	0.00	-0.10
WCA-3B	<0.01	-0.07
ENP	0.00	-0.03



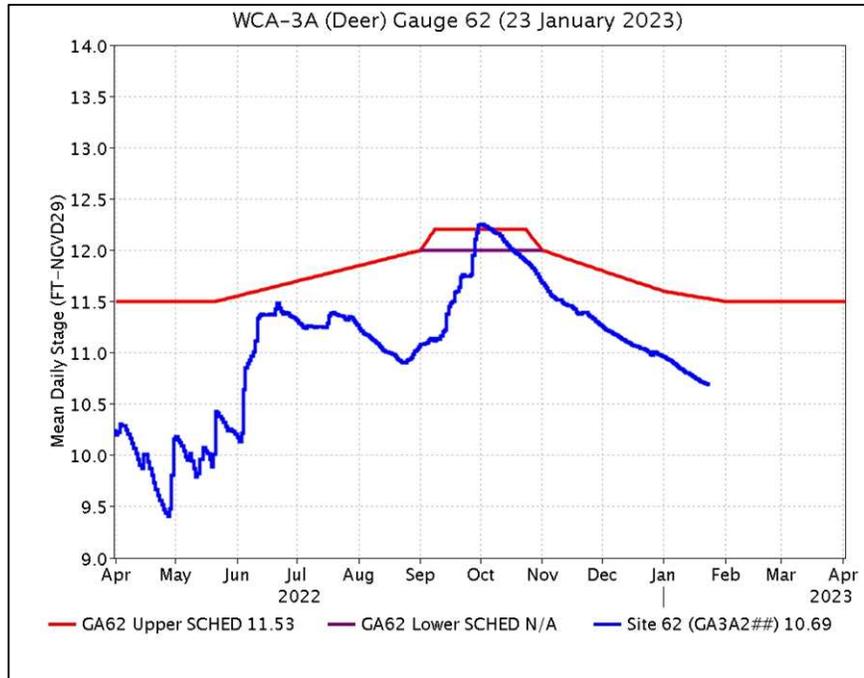
**Figure EV-1.** WCA-1 stage hydrographs and regulation schedule.



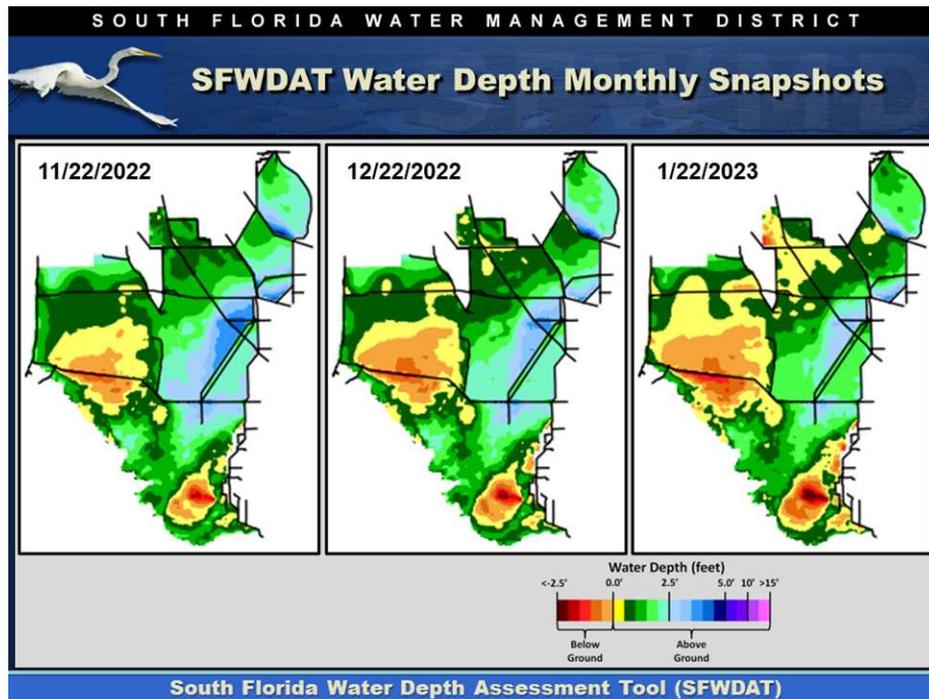
**Figure EV-2.** WCA-2A stage hydrographs and regulation schedule.



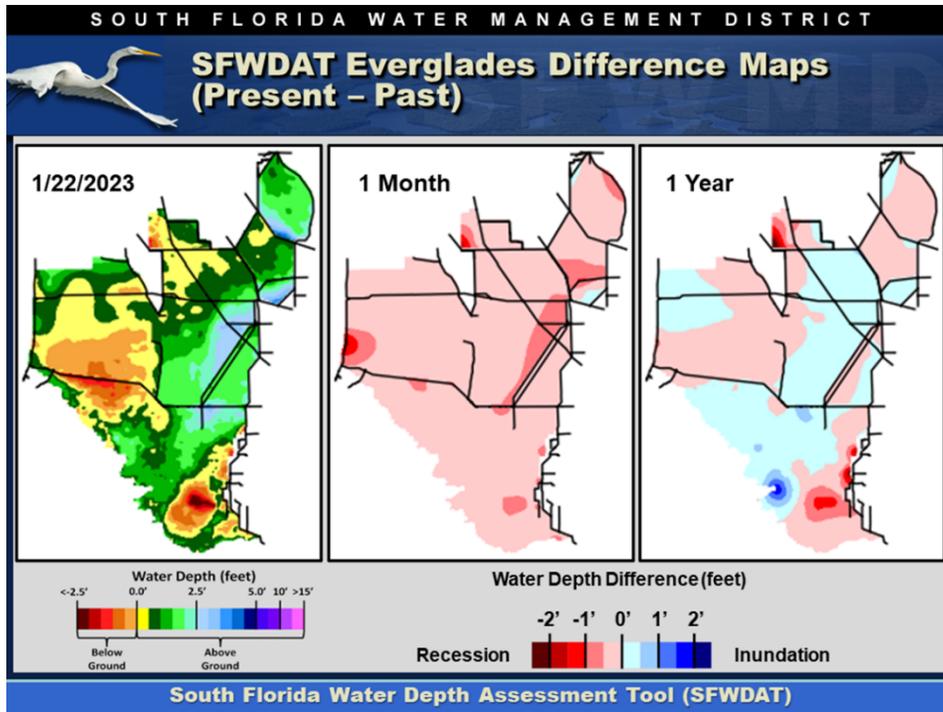
**Figure EV-3.** WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.



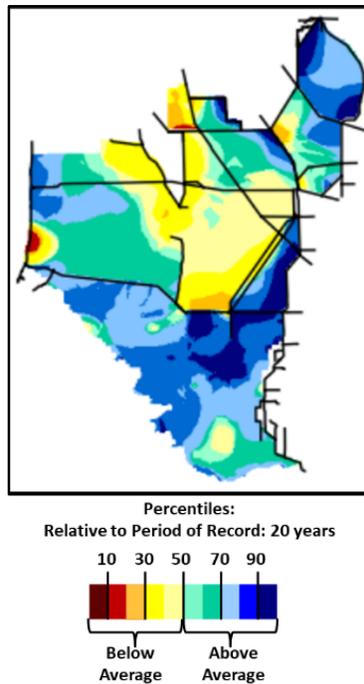
**Figure EV-4.** WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.



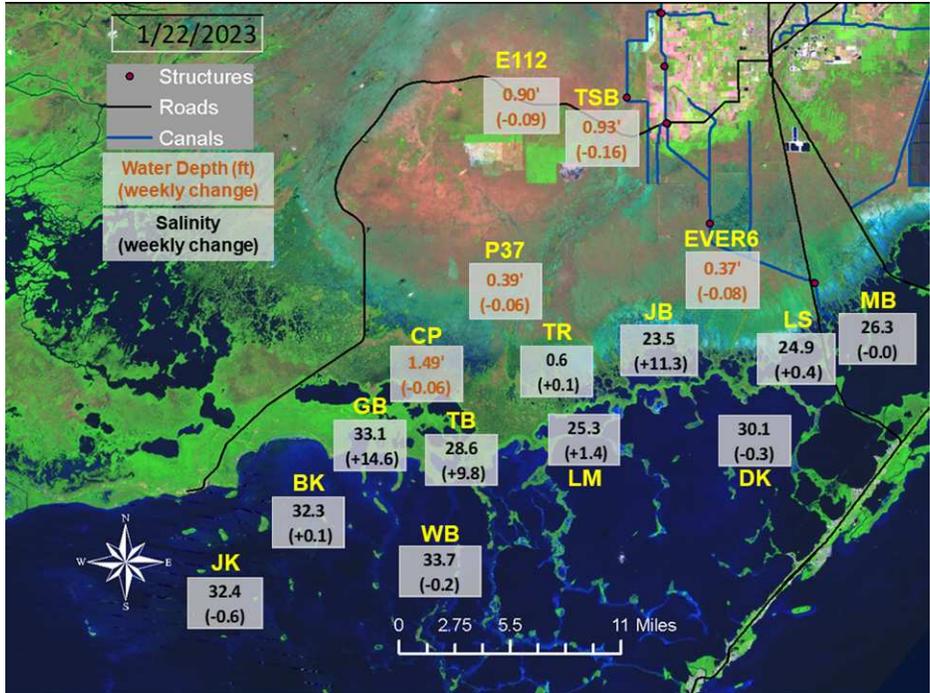
**Figure EV-5.** Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.



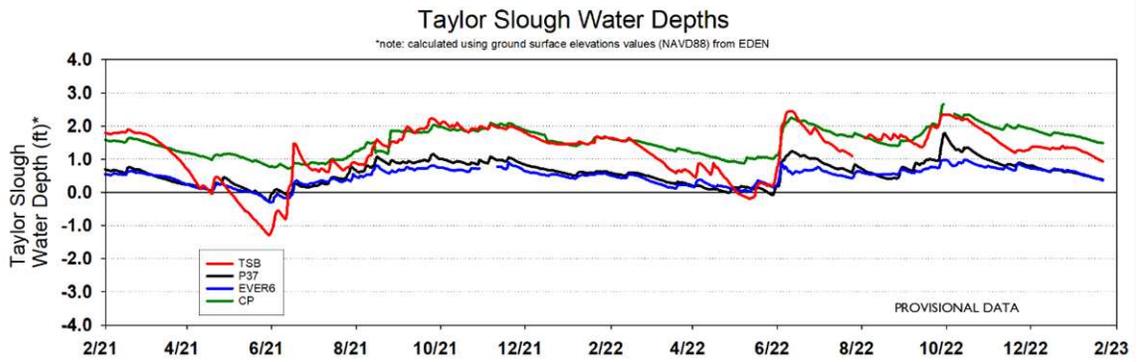
**Figure EV-6.** Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.



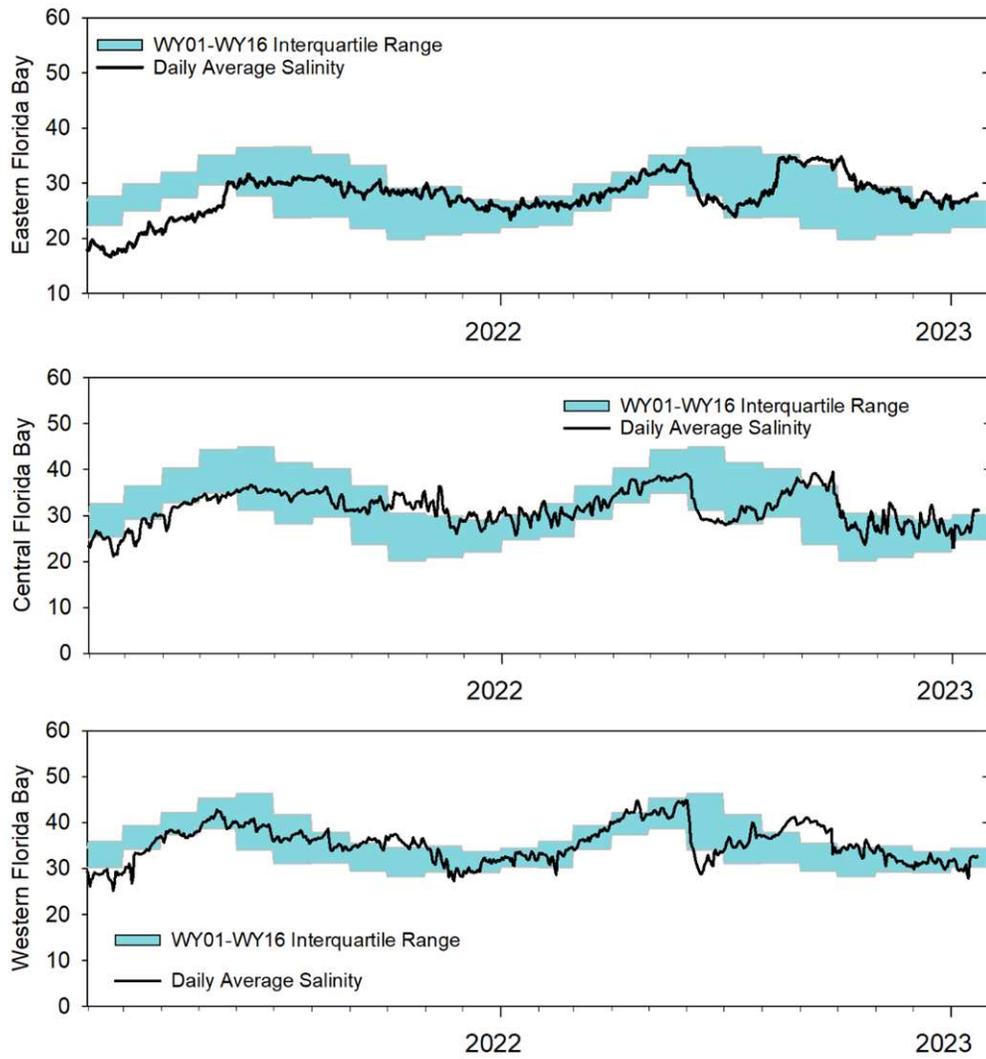
**Figure EV-7.** Present water depths (1/22/2023) compared to the day of year average over the previous 20 years.



**Figure EV-8.** Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.



**Figure EV-9.** Taylor Slough water depth time series.



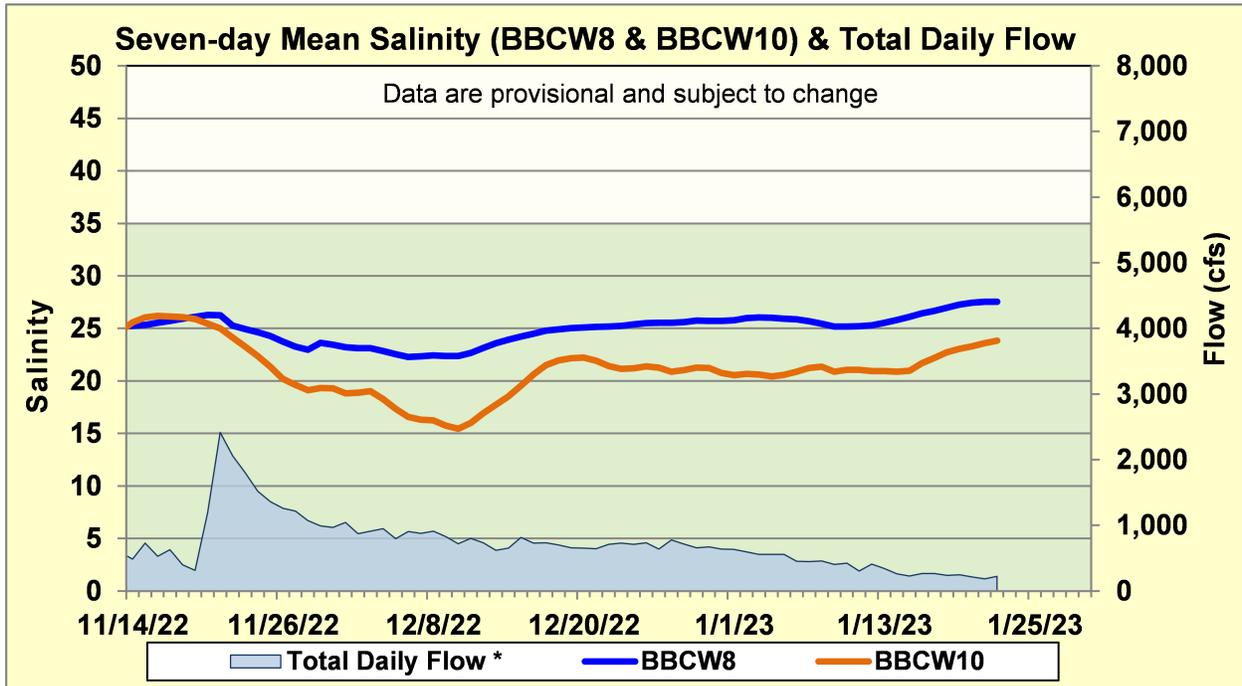
**Figure EV-10.** Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

**Table EV-2.** Weekly water depth changes and water management recommendations

<b>SFWMD Everglades Ecological Recommendations, January 24<sup>th</sup> 2023 (red is new)</b>			
<b>Area</b>	<b>Weekly change</b>	<b>Recommendation</b>	<b>Reasons</b>
<b>WCA-1</b>	Stage decreased by 0.07'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-2A</b>	Stage decreased by 0.10'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife. Protect conditions conducive to wading bird foraging later in the season.
<b>WCA-2B</b>	Stage decreased by 0.06'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-3A NE</b>	Stage decreased by 0.09'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week	Protect within basin and downstream habitat and wildlife. Protect conditions conducive to wading bird foraging later in the season. Lower fire risk and protect peat soils.
<b>WCA-3A NW</b>	Stage decreased by 0.08'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week	
<b>Central WCA-3A S</b>	Stage decreased by 0.09'	Conserve water in this basin as possible. Recession rate of less than 0.10' per week	Protect within basin and downstream habitat and wildlife.
<b>Southern WCA-3A S</b>	Stage decreased by 0.12'		
<b>WCA-3B</b>	Stage decreased by 0.07'	Recession rate of less than 0.10' per week.	Protect within basin and downstream habitat and wildlife.
<b>ENP-SRS</b>	Stage decreased by 0.03'	Make discharges to ENP according to COP and TTF protocol while adaptively considering upstream and downstream ecological conditions. Discussions on water management within the system should be continued.	Protect within basin and upstream habitat and wildlife.
<b>Taylor Slough</b>	Stage changes ranged from -0.16' to -0.05'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
<b>FB- Salinity</b>	Salinity changes ranged from -0.6 to +14.6	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.

## Biscayne Bay

As shown in **Figure BB-1**, mean total inflow to Biscayne Bay was 234 cfs and the previous 30-day mean inflow was 461 cfs. The seven-day mean salinity was 27.4 at BBCW8 and 24.2 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data provided by Biscayne National Park.



**Figure BB-1.** Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.